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BOTTOM MOORED CURRENT METER
DATA FROM THE SOUTHEAST
HANCOCK SEAMOUNT IN APRIL 1987

Shannon C. Raugust, Russell E. Brainard
and Roland W. Garwood, Jr.

June 1988

Data Report for Period
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Foreword

The data presented here were collected with the assistance of several institutions. Funding support was provided by the Office of Naval Research, and ship time on the NOAA ship Townsend Cromwell was provided by the Honolulu Laboratory of the National Marine Fisheries Service. The Atlantic Oceanographic and Meteorological Laboratory, NOAA supplied three of the current meters. The moorings were prepared and initial data processing was done at the Pacific Marine Environmental Laboratory, NOAA. Instrument calibration was performed by the Northwest Regional Calibration Center, Bellevue, Washington.

1. Introduction

Two bottom moored current meter arrays were deployed on the South East Hancock Seamount ($29^{\circ} 48' N$, $179^{\circ} 04' E$) in April 1987. The purpose of the project was to observe for the first time the currents near the summit of this seamount, to determine dominant short period (10 minutes - 50 hours) constituents and variability for the current field and to provide data for future current meter array design. The period of observations was limited to 15 days because of research vessel scheduling.

Presented in this report are velocity and temperature data collected from the current meters during this deployment. The report consists of six sections. The field program is discussed in Section 2. Section 3 contains the data editing steps and presents the raw 5 minute time series, histograms and statistics. Hourly time series are presented in section 4, and low pass filtered six-hourly time series are presented in section 5. Section 6 contains the composited low pass time series for each mooring based on the time series presented in section 5. Variance density spectra for current velocities and temperatures are given in section 7.

2. Field Program

The two moorings were deployed on the South East Hancock Seamount from the NOAA ship Townsend Cromwell on 12 April 1987 and were recovered on 27 April 1987. A large scale fisheries survey was conducted concurrent with the mooring deployment. The location of the South East Hancock Seamount is shown in Figure 1 on page 3. Mooring 87V1 was deployed at or very near to the highest elevation of the seamount at 29° 48.38' N, 179° 03.51' E in 260 meters of water. Mooring 87V2 was deployed on the flank of the seamount at 29° 48.89' N, 179° 03.25' E at a depth of approximately 390 meters. The two moorings are separated laterally by approximately 1030 meters. Originally, this second mooring was intended to be anchored at a depth of 350 meters. However, the observed temperature and pressure records indicate that the actual depth exceeded the intended depth by approximately 50 meters. It is believed that the anchor and mooring failed to take hold at the intended depth due to an unexpectedly steep bottom slope on the seamount flank. A schematic of the configuration of the moorings as actually deployed is shown in Figure 2 on page 4.

Mooring 87V1 had 5 Aanderaa RCM-4 current meters mounted at 50, 165, 215, 255 and 260 meters below the surface. In this report, these meters are given the labels V11, V12, V13, V14 and V15 respectively. Mooring 87V2 had 3 Aanderaa RCM-4 current meters mounted at 215, 265 and 390 meters below the surface. The design depths had actually been 165, 215 and 340 meters respectively. The meters on 87V2 were given the labels V23, V25 and V26 to simplify comparisons with the meters on 87V1 that were situated at about the same depths.

The launch and recovery data for each mooring are summarized in Table 1 on page 5.

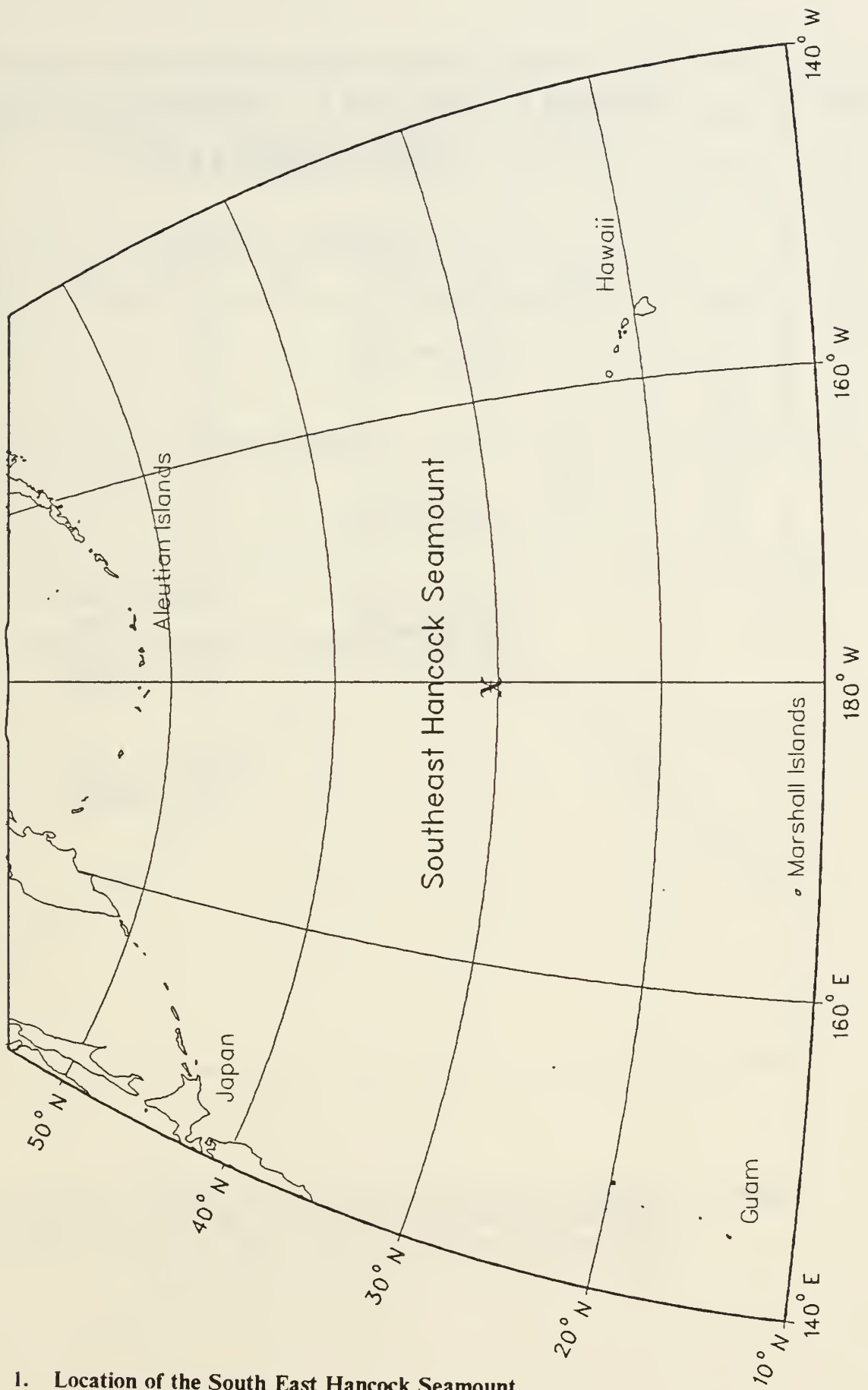


Figure 1. Location of the South East Hancock Seamount.

SOUTHEAST HANCOCK SEAMOUNT

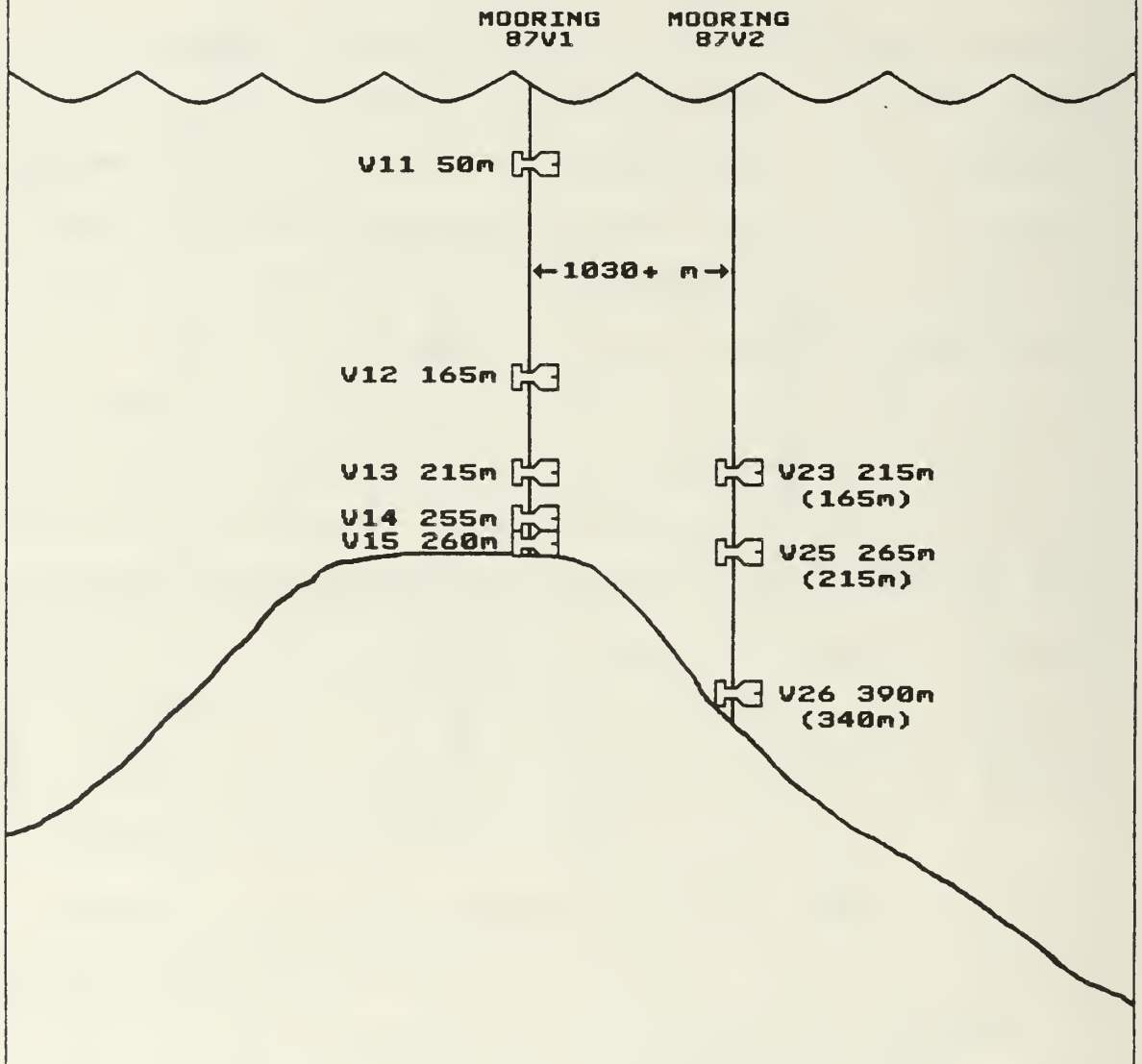


Figure 2. Deployment configuration of moorings 87V1 and 87V2.: The depths in parentheses for mooring 87V2 are the design depths. The actual deployment depths are noted to the right of the meter labels. Vertical axis: 1 inch = 100 meters. Horizontal axis: Not to scale.

Mooring ID	Location Lat/Long	Bottom Depth (M)	Launch Time GMT	Recovery Time GMT	Current Meter Depth (M)	RCM-4 Current Meter Serial #
87V1	29° 48.38' N 179° 3.51' E	260	0500 12 Apr 87	1920 27 Apr 87	50	2760
					165	0407
					215	5211
					255	5644
					260	5643
87V2	29° 48.89' N 179° 3.25' E	390	2220 12 Apr 87	2045 27 Apr 87	215	0408
					265	2759
					390	5645

Table 1. Launch and recovery information

3. Data Editing

The initial post-processing of the data was done at Pacific Marine Environmental Laboratory using three programs: CM1, CME and C2C. Program CM1 was used to buffer the data off the cartridge and transform it into scientific units. Program CME was used to determine data start and stop times and to remove obviously wrong values. Program C2C was used to remove large obviously erroneous spikes and questionable zero speeds. The data were then sent by 9 track tape to the Naval Postgraduate School for final editing and processing. The current meters stored data in 5 minute intervals. The processed current velocity data has been represented here in easterly (U) and northerly (V) components.

The statistics of the basic 5-minute velocity components and temperature data are shown in Table 2 on page 7 and Table 3 on page 8, and histograms and time series are presented in Figure 3 on page 9. Due to a possible bearing failure, current meter V25 recorded a large number of zero speeds in the north and east velocity components, but the temperature data from this meter are unaffected by the problem.

V11				
	Mean	St. Dev.	Skewness	Kurtosis
U (Cm/Sec)	-9.336	9.337	0.073	2.962
V (Cm/Sec)	1.246	6.445	-0.846	4.124
Temp (Deg C)	18.023	0.707	-5.763	191.313
V12				
	Mean	St. Dev.	Skewness	Kurtosis
U (Cm/Sec)	-11.641	6.327	0.498	4.165
V (Cm/Sec)	4.903	6.911	-0.453	3.144
Temp (Deg C)	15.460	0.381	-20.596	811.999
V13				
	Mean	St. Dev.	Skewness	Kurtosis
U (Cm/Sec)	-9.436	6.861	0.129	3.042
V (Cm/Sec)	6.267	6.498	-0.554	2.941
Temp (Deg C)	14.740	0.344	-21.554	1175.635
V14				
	Mean	St. Dev.	Skewness	Kurtosis
U (Cm/Sec)	-10.902	7.896	0.143	2.761
V (Cm/Sec)	7.456	6.786	-0.342	2.771
Temp (Deg C)	13.983	0.312	-13.683	1113.496
V15				
	Mean	St. Dev.	Skewness	Kurtosis
U (Cm/Sec)	-10.356	8.013	0.241	3.645
V (Cm/Sec)	6.908	6.818	-0.548	3.016
Temp (Deg C)	13.679	0.309	-11.209	804.698

Table 2. Statistics of the 87V1 velocity components and temperature

V23				
	Mean	St. Dev.	Skewness	Kurtosis
U (Cm/Sec)	-9.277	6.122	0.001	2.790
V (Cm/Sec)	5.905	5.552	-0.155	2.427
Temp (Deg C)	14.643	0.280	-19.168	1398.333
V25				
	Mean	St. Dev.	Skewness	Kurtosis
U (Cm/Sec)	-4.600	7.436	-0.729	2.966
V (Cm/Sec)	1.914	4.796	0.488	3.759
Temp (Deg C)	13.910	0.328	-8.960	345.262
V26				
	Mean	St. Dev.	Skewness	Kurtosis
U (Cm/Sec)	-2.255	8.428	0.111	2.509
V (Cm/Sec)	1.509	5.674	1.881	7.491
Temp (Deg C)	11.325	0.522	-1.204	10.087

Table 3. Statistics of the 87V2 velocity components and temperature

Figure 3. Figures 3.1 - 3.24: Histograms of the velocity components and temperature of the basic 5 minute interval data set. Figures 3.25 - 3.32: Time series of the same data.

FIGURE 3.1

V11 EAST

NO. OF POINTS = 4492 BIN SIZE = 2.0 CM/SEC

BIN	BOUND	FREQ	PERCENT	
1	<-40.0	0	0.00	
2	-38.0	0	0.00	
3	-36.0	2	0.04	
4	-34.0	5	0.11	
5	-32.0	11	0.24	
6	-30.0	33	0.73	X
7	-28.0	49	1.09	X
8	-26.0	65	1.45	X
9	-24.0	114	2.54	XXX
10	-22.0	149	3.32	XXX
11	-20.0	174	3.87	XXXX
12	-18.0	203	4.52	XXXXX
13	-16.0	243	5.41	XXXXX
14	-14.0	321	7.15	XXXXXXXX
15	-12.0	321	7.15	XXXXXXXX
16	-10.0	416	9.26	XXXXXXXXXX
17	-8.0	418	9.31	XXXXXXXXXX
18	-6.0	340	7.57	XXXXXXXXXX
19	-4.0	315	7.01	XXXXXXXXXX
20	-2.0	346	7.70	XXXXXXXXXX
21	0.0	296	6.59	XXXXXXXXXX
22	2.0	228	5.08	XXXXXX
23	4.0	68	1.51	XX
24	6.0	112	2.49	XX
25	8.0	86	1.91	XX
26	10.0	65	1.45	X
27	12.0	31	0.69	X
28	14.0	35	0.78	X
29	16.0	32	0.71	X
30	18.0	10	0.22	
31	20.0	3	0.07	
32	22.0	1	0.02	
33	24.0	0	0.00	
34	26.0	0	0.00	
35	28.0	0	0.00	
36	30.0	0	0.00	
37	32.0	0	0.00	
38	34.0	0	0.00	
39	36.0	0	0.00	
40	38.0	0	0.00	
41	40.0	0	0.00	
42	>40.0	0	0.00	

FIGURE 3.2

V11 NORTH

NO. OF POINTS = 4492 BIN SIZE = 2.0 CM/SEC

BIN	BOUND	FREQ	PERCENT	
1	<-40.0	0	0.00	
2	-38.0	0	0.00	
3	-36.0	0	0.00	
4	-34.0	0	0.00	
5	-32.0	0	0.00	
6	-30.0	0	0.00	
7	-28.0	0	0.00	
8	-26.0	0	0.00	
9	-24.0	0	0.00	
10	-22.0	1	0.02	
11	-20.0	10	0.22	
12	-18.0	27	0.60	X
13	-16.0	58	1.29	X
14	-14.0	69	1.54	XX
15	-12.0	89	1.98	XX
16	-10.0	112	2.49	XX
17	-8.0	80	1.78	XX
18	-6.0	91	2.03	XX
19	-4.0	126	2.80	XXX
20	-2.0	187	4.16	XXXX
21	0.0	447	9.95	XXXXXXXXXX
22	2.0	1181	26.29	XXXXXXXXXXXXXXXXXXXXXXXXXXXX
23	4.0	530	11.80	XXXXXXXXXXXX
24	6.0	550	12.24	XXXXXXXXXXXX
25	8.0	360	8.01	XXXXXXX
26	10.0	277	6.17	XXXXXX
27	12.0	170	3.78	XXXX
28	14.0	102	2.27	XX
29	16.0	20	0.45	
30	18.0	5	0.11	
31	20.0	0	0.00	
32	22.0	0	0.00	
33	24.0	0	0.00	
34	26.0	0	0.00	
35	28.0	0	0.00	
36	30.0	0	0.00	
37	32.0	0	0.00	
38	34.0	0	0.00	
39	36.0	0	0.00	
40	38.0	0	0.00	
41	40.0	0	0.00	
42	>40.0	0	0.00	

V11 TEMPERATURE

NO. OF POINTS - 4492 BIN SIZE - .1 DEG C

BIN	BOUND	FREQ	PERCENT	
1	<16.0	0	0.00	
2	16.1	0	0.00	
3	16.2	0	0.00	
4	16.3	0	0.00	
5	16.4	3	0.07	
6	16.5	10	0.22	
7	16.6	5	0.11	
8	16.7	18	0.40	
9	16.8	41	0.91	X
10	16.9	58	1.29	X
11	17.0	69	1.54	XX
12	17.1	98	2.18	XX
13	17.2	147	3.27	XXX
14	17.3	164	3.65	XXXX
15	17.4	234	5.21	XXXXXX
16	17.5	186	4.14	XXXX
17	17.6	183	4.07	XXXX
18	17.7	204	4.54	XXXXXX
19	17.8	229	5.10	XXXXXX
20	17.9	239	5.32	XXXXXX
21	18.0	168	3.74	XXXX
22	18.1	183	4.07	XXXX
23	18.2	357	7.95	XXXXXXXXXX
24	18.3	315	7.01	XXXXXXXXXX
25	18.4	234	5.21	XXXXXX
26	18.5	256	5.70	XXXXXX
27	18.6	233	5.19	XXXXXX
28	18.7	252	5.61	XXXXXX
29	18.8	248	5.52	XXXXXX
30	18.9	99	2.20	XX
31	19.0	91	2.03	XX
32	19.1	52	1.16	X
33	19.2	24	0.53	X
34	19.3	22	0.49	
35	19.4	17	0.38	
36	19.5	6	0.13	
37	19.6	3	0.07	
38	19.7	5	0.11	
39	19.8	5	0.11	
40	19.9	1	0.02	
41	20.0	5	0.11	
42	>20.0	28	0.62	X

FIGURE 3.4

V12 EAST

NO. OF POINTS - 4492 BIN SIZE - 2.0 CM/SEC

BIN	BOUND	FREQ	PERCENT	
1	<-40.0	0	0.00	
2	-38.0	0	0.00	
3	-36.0	0	0.00	
4	-34.0	0	0.00	
5	-32.0	0	0.00	
6	-30.0	0	0.00	
7	-28.0	8	0.18	
8	-26.0	10	0.22	
9	-24.0	86	1.91	XX
10	-22.0	131	2.92	XXX
11	-20.0	171	3.81	XXXX
12	-18.0	260	5.79	XXXXXX
13	-16.0	343	7.64	XXXXXXXX
14	-14.0	465	10.35	XXXXXXXXXX
15	-12.0	646	14.38	XXXXXXXXXXXXXX
16	-10.0	724	16.12	XXXXXXXXXXXXXXXXXX
17	-8.0	616	13.71	XXXXXXXXXXXXXXXXXX
18	-6.0	405	9.02	XXXXXXXXXX
19	-4.0	249	5.54	XXXXXX
20	-2.0	107	2.38	XX
21	0.0	61	1.36	X
22	2.0	46	1.02	X
23	4.0	43	0.96	X
24	6.0	46	1.02	X
25	8.0	38	0.85	X
26	10.0	23	0.51	X
27	12.0	10	0.22	
28	14.0	4	0.09	
29	16.0	0	0.00	
30	18.0	0	0.00	
31	20.0	0	0.00	
32	22.0	0	0.00	
33	24.0	0	0.00	
34	26.0	0	0.00	
35	28.0	0	0.00	
36	30.0	0	0.00	
37	32.0	0	0.00	
38	34.0	0	0.00	
39	36.0	0	0.00	
40	38.0	0	0.00	
41	40.0	0	0.00	
42	>40.0	0	0.00	

FIGURE 3.5

V12 NORTH

NO. OF POINTS = 4492 BIN SIZE = 2.0 CM/SEC

BIN	BOUND	FREQ	PERCENT	
1	<-40.0	0	0.00	
2	-38.0	0	0.00	
3	-36.0	0	0.00	
4	-34.0	0	0.00	
5	-32.0	0	0.00	
6	-30.0	0	0.00	
7	-28.0	0	0.00	
8	-26.0	0	0.00	
9	-24.0	0	0.00	
10	-22.0	0	0.00	
11	-20.0	3	0.07	
12	-18.0	9	0.20	
13	-16.0	10	0.22	
14	-14.0	16	0.36	
15	-12.0	24	0.53	X
16	-10.0	46	1.02	X
17	-8.0	82	1.83	XX
18	-6.0	141	3.14	XXX
19	-4.0	144	3.21	XXX
20	-2.0	253	5.63	XXXXXX
21	0.0	324	7.21	XXXXXXXX
22	2.0	368	8.19	XXXXXXXX
23	4.0	435	9.68	XXXXXXXXXX
24	6.0	527	11.73	XXXXXXXXXXXX
25	8.0	510	11.35	XXXXXXXXXXXX
26	10.0	441	9.82	XXXXXXXXXX
27	12.0	470	10.46	XXXXXXXXXX
28	14.0	356	7.93	XXXXXXXX
29	16.0	221	4.92	XXXXX
30	18.0	68	1.51	XX
31	20.0	21	0.47	
32	22.0	11	0.24	
33	24.0	6	0.13	
34	26.0	3	0.07	
35	28.0	2	0.04	
36	30.0	1	0.02	
37	32.0	0	0.00	
38	34.0	0	0.00	
39	36.0	0	0.00	
40	38.0	0	0.00	
41	40.0	0	0.00	
42	>40.0	0	0.00	

FIGURE 3.6

V12 TEMPERATURE

NO. OF POINTS = 4492 BIN SIZE = .1 DEG C

BIN	BOUND	FREQ	PERCENT	
1	<14.0	0	0.00	
2	14.1	0	0.00	
3	14.2	0	0.00	
4	14.3	0	0.00	
5	14.4	0	0.00	
6	14.5	0	0.00	
7	14.6	0	0.00	
8	14.7	0	0.00	
9	14.8	13	0.29	
10	14.9	26	0.58	X
11	15.0	89	1.98	XX
12	15.1	218	4.85	XXXXXX
13	15.2	372	8.28	XXXXXXXXXX
14	15.3	501	11.15	XXXXXXXXXXXX
15	15.4	739	16.45	XXXXXXXXXXXXXXXXXX
16	15.5	647	14.40	XXXXXXXXXXXXXXXXXX
17	15.6	613	13.65	XXXXXXXXXXXXXXXXXX
18	15.7	500	11.13	XXXXXXXXXXXX
19	15.8	392	8.73	XXXXXXXXXX
20	15.9	149	3.32	XXX
21	16.0	78	1.74	XX
22	16.1	38	0.85	X
23	16.2	35	0.78	X
24	16.3	37	0.82	X
25	16.4	25	0.56	X
26	16.5	13	0.29	
27	16.6	7	0.16	
28	16.7	0	0.00	
29	16.8	0	0.00	
30	16.9	0	0.00	
31	17.0	0	0.00	
32	17.1	0	0.00	
33	17.2	0	0.00	
34	17.3	0	0.00	
35	17.4	0	0.00	
36	17.5	0	0.00	
37	17.6	0	0.00	
38	17.7	0	0.00	
39	17.8	0	0.00	
40	17.9	0	0.00	
41	18.0	0	0.00	
42	>18.0	0	0.00	

FIGURE 3.7

V13 EAST

NO. OF POINTS = 4493 BIN SIZE = 2.0 CM/SEC

BIN	BOUND	FREQ	PERCENT	
1	<-40.0	0	0.00	
2	-38.0	0	0.00	
3	-36.0	0	0.00	
4	-34.0	0	0.00	
5	-32.0	0	0.00	
6	-30.0	2	0.04	
7	-28.0	11	0.24	
8	-26.0	16	0.36	
9	-24.0	31	0.69	X
10	-22.0	69	1.54	XX
11	-20.0	143	3.18	XXX
12	-18.0	215	4.79	XXXXX
13	-16.0	271	6.03	XXXXXX
14	-14.0	384	8.55	XXXXXXXXXX
15	-12.0	452	10.06	XXXXXXXXXXXX
16	-10.0	506	11.26	XXXXXXXXXXXX
17	-8.0	498	11.08	XXXXXXXXXXXX
18	-6.0	541	12.04	XXXXXXXXXXXX
19	-4.0	488	10.86	XXXXXXXXXXXX
20	-2.0	289	6.43	XXXXXX
21	0.0	206	4.58	XXXXX
22	2.0	117	2.60	XXX
23	4.0	91	2.03	XX
24	6.0	73	1.62	XX
25	8.0	53	1.18	X
26	10.0	26	0.58	X
27	12.0	10	0.22	
28	14.0	1	0.02	
29	16.0	0	0.00	
30	18.0	0	0.00	
31	20.0	0	0.00	
32	22.0	0	0.00	
33	24.0	0	0.00	
34	26.0	0	0.00	
35	28.0	0	0.00	
36	30.0	0	0.00	
37	32.0	0	0.00	
38	34.0	0	0.00	
39	36.0	0	0.00	
40	38.0	0	0.00	
41	40.0	0	0.00	
42	>40.0	0	0.00	

FIGURE 3.8

V13 NORTH

NO. OF POINTS = 4493 BIN SIZE = 2.0 CM/SEC

BIN	BOUND	FREQ	PERCENT	
1	<-40.0	0	0.00	
2	-38.0	0	0.00	
3	-36.0	0	0.00	
4	-34.0	0	0.00	
5	-32.0	0	0.00	
6	-30.0	0	0.00	
7	-28.0	0	0.00	
8	-26.0	0	0.00	
9	-24.0	0	0.00	
10	-22.0	0	0.00	
11	-20.0	0	0.00	
12	-18.0	0	0.00	
13	-16.0	2	0.04	
14	-14.0	5	0.11	
15	-12.0	17	0.38	
16	-10.0	22	0.49	
17	-8.0	74	1.65	XX
18	-6.0	116	2.58	XXX
19	-4.0	157	3.49	XXX
20	-2.0	161	3.58	XXXX
21	0.0	203	4.52	XXXXX
22	2.0	321	7.14	XXXXXXXX
23	4.0	371	8.26	XXXXXXXXX
24	6.0	483	10.75	XXXXXXXXXXX
25	8.0	553	12.31	XXXXXXXXXXXXX
26	10.0	602	13.40	XXXXXXXXXXXXXX
27	12.0	538	11.97	XXXXXXXXXXXXX
28	14.0	442	9.84	XXXXXXXXXXXXX
29	16.0	260	5.79	XXXXXX
30	18.0	102	2.27	XX
31	20.0	55	1.22	X
32	22.0	9	0.20	
33	24.0	0	0.00	
34	26.0	0	0.00	
35	28.0	0	0.00	
36	30.0	0	0.00	
37	32.0	0	0.00	
38	34.0	0	0.00	
39	36.0	0	0.00	
40	38.0	0	0.00	
41	40.0	0	0.00	
42	>40.0	0	0.00	

FIGURE 3.9

V13 TEMPERATURE

NO. OF POINTS = 4493 BIN SIZE = .1 DEG C

BIN	BOUND	FREQ	PERCENT	
1	<13.0	0	0.00	
2	13.1	0	0.00	
3	13.2	0	0.00	
4	13.3	0	0.00	
5	13.4	0	0.00	
6	13.5	0	0.00	
7	13.6	0	0.00	
8	13.7	0	0.00	
9	13.8	0	0.00	
10	13.9	2	0.04	
11	14.0	8	0.18	
12	14.1	20	0.45	
13	14.2	60	1.34	X
14	14.3	152	3.38	XXX
15	14.4	304	6.77	XXXXXXXX
16	14.5	364	8.10	XXXXXXXXXX
17	14.6	504	11.22	XXXXXXXXXXXX
18	14.7	534	11.89	XXXXXXXXXXXX
19	14.8	515	11.46	XXXXXXXXXXXX
20	14.9	638	14.20	XXXXXXXXXXXXXXXX
21	15.0	581	12.93	XXXXXXXXXXXXXXXX
22	15.1	411	9.15	XXXXXXXXXXXX
23	15.2	213	4.74	XXXXXX
24	15.3	127	2.83	XXX
25	15.4	47	1.05	X
26	15.5	9	0.20	
27	15.6	4	0.09	
28	15.7	0	0.00	
29	15.8	0	0.00	
30	15.9	0	0.00	
31	16.0	0	0.00	
32	16.1	0	0.00	
33	16.2	0	0.00	
34	16.3	0	0.00	
35	16.4	0	0.00	
36	16.5	0	0.00	
37	16.6	0	0.00	
38	16.7	0	0.00	
39	16.8	0	0.00	
40	16.9	0	0.00	
41	17.0	0	0.00	
42	>17.0	0	0.00	

FIGURE 3.10

V14 EAST

NO. OF POINTS = 4493 BIN SIZE = 2.0 CM/SEC

BIN	BOUND	FREQ	PERCENT	
1	<-40.0	0	0.00	
2	-38.0	0	0.00	
3	-36.0	0	0.00	
4	-34.0	0	0.00	
5	-32.0	4	0.09	
6	-30.0	18	0.40	
7	-28.0	23	0.51	X
8	-26.0	33	0.73	X
9	-24.0	109	2.43	XX
10	-22.0	187	4.16	XXXX
11	-20.0	239	5.32	XXXXX
12	-18.0	247	5.50	XXXXX
13	-16.0	341	7.59	XXXXXXXX
14	-14.0	354	7.88	XXXXXXXX
15	-12.0	446	9.93	XXXXXXXXXX
16	-10.0	490	10.91	XXXXXXXXXXXX
17	-8.0	465	10.35	XXXXXXXXXXXX
18	-6.0	384	8.55	XXXXXXXXXX
19	-4.0	319	7.10	XXXXXXX
20	-2.0	246	5.48	XXXXXX
21	0.0	150	3.34	XXX
22	2.0	153	3.41	XXX
23	4.0	111	2.47	XX
24	6.0	90	2.00	XX
25	8.0	51	1.14	X
26	10.0	19	0.42	
27	12.0	9	0.20	
28	14.0	5	0.11	
29	16.0	0	0.00	
30	18.0	0	0.00	
31	20.0	0	0.00	
32	22.0	0	0.00	
33	24.0	0	0.00	
34	26.0	0	0.00	
35	28.0	0	0.00	
36	30.0	0	0.00	
37	32.0	0	0.00	
38	34.0	0	0.00	
39	36.0	0	0.00	
40	38.0	0	0.00	
41	40.0	0	0.00	
42	>40.0	0	0.00	

FIGURE 3.11

V14 NORTH

NO. OF POINTS = 4493 BIN SIZE = 2.0 CM/SEC

BIN	BOUND	FREQ	PERCENT	
1	<-40.0	0	0.00	
2	-38.0	0	0.00	
3	-36.0	0	0.00	
4	-34.0	0	0.00	
5	-32.0	0	0.00	
6	-30.0	0	0.00	
7	-28.0	0	0.00	
8	-26.0	0	0.00	
9	-24.0	0	0.00	
10	-22.0	0	0.00	
11	-20.0	0	0.00	
12	-18.0	0	0.00	
13	-16.0	0	0.00	
14	-14.0	0	0.00	
15	-12.0	6	0.13	
16	-10.0	21	0.47	
17	-8.0	36	0.80	X
18	-6.0	82	1.83	XX
19	-4.0	162	3.61	XXXX
20	-2.0	194	4.32	XXXX
21	0.0	161	3.58	XXXX
22	2.0	288	6.41	XXXXXX
23	4.0	349	7.77	XXXXXXXX
24	6.0	425	9.46	XXXXXXXXXX
25	8.0	462	10.28	XXXXXXXXXXXX
26	10.0	532	11.84	XXXXXXXXXXXXXX
27	12.0	553	12.31	XXXXXXXXXXXXXX
28	14.0	476	10.59	XXXXXXXXXXXXXX
29	16.0	372	8.28	XXXXXXXXXX
30	18.0	203	4.52	XXXXXX
31	20.0	101	2.25	XX
32	22.0	35	0.78	X
33	24.0	21	0.47	
34	26.0	8	0.18	
35	28.0	5	0.11	
36	30.0	1	0.02	
37	32.0	0	0.00	
38	34.0	0	0.00	
39	36.0	0	0.00	
40	38.0	0	0.00	
41	40.0	0	0.00	
42	>40.0	0	0.00	

FIGURE 3.12

V14 TEMPERATURE

NO. OF POINTS = 4493 BIN SIZE = .1 DEG C

BIN	BOUND	FREQ	PERCENT	
1	<12.0	0	0.00	
2	12.1	0	0.00	
3	12.2	0	0.00	
4	12.3	0	0.00	
5	12.4	0	0.00	
6	12.5	0	0.00	
7	12.6	0	0.00	
8	12.7	0	0.00	
9	12.8	0	0.00	
10	12.9	0	0.00	
11	13.0	0	0.00	
12	13.1	0	0.00	
13	13.2	1	0.02	
14	13.3	8	0.18	
15	13.4	55	1.22	X
16	13.5	99	2.20	XX
17	13.6	182	4.05	XXXX
18	13.7	349	7.77	XXXXXXXX
19	13.8	506	11.26	XXXXXXXXXXXX
20	13.9	517	11.51	XXXXXXXXXXXX
21	14.0	559	12.44	XXXXXXXXXXXX
22	14.1	667	14.85	XXXXXXXXXXXX
23	14.2	559	12.44	XXXXXXXXXXXX
24	14.3	394	8.77	XXXXXXXXXX
25	14.4	286	6.37	XXXXXX
26	14.5	134	2.98	XXX
27	14.6	120	2.67	XXX
28	14.7	57	1.27	X
29	14.8	0	0.00	
30	14.9	0	0.00	
31	15.0	0	0.00	
32	15.1	0	0.00	
33	15.2	0	0.00	
34	15.3	0	0.00	
35	15.4	0	0.00	
36	15.5	0	0.00	
37	15.6	0	0.00	
38	15.7	0	0.00	
39	15.8	0	0.00	
40	15.9	0	0.00	
41	16.0	0	0.00	
42	>16.0	0	0.00	

FIGURE 3.13

V15 EAST

NO. OF POINTS = 4492 BIN SIZE = 2.0 CM/SEC

BIN	BOUND	FREQ	PERCENT	
1	<-40.0	0	0.00	
2	-38.0	0	0.00	
3	-36.0	0	0.00	
4	-34.0	0	0.00	
5	-32.0	0	0.00	
6	-30.0	10	0.22	
7	-28.0	30	0.67	X
8	-26.0	34	0.76	X
9	-24.0	104	2.32	XX
10	-22.0	182	4.05	XXXX
11	-20.0	208	4.63	XXXXX
12	-18.0	235	5.23	XXXXX
13	-16.0	315	7.01	XXXXXXXX
14	-14.0	345	7.68	XXXXXXXXX
15	-12.0	367	8.17	XXXXXXXXX
16	-10.0	442	9.84	XXXXXXXXXX
17	-8.0	494	11.00	XXXXXXXXXXXX
18	-6.0	453	10.08	XXXXXXXXXXXX
19	-4.0	383	8.53	XXXXXXXXXX
20	-2.0	256	5.70	XXXXXX
21	0.0	210	4.67	XXXXXX
22	2.0	155	3.45	XXX
23	4.0	102	2.27	XX
24	6.0	70	1.56	XX
25	8.0	43	0.96	X
26	10.0	24	0.53	X
27	12.0	12	0.27	
28	14.0	6	0.13	
29	16.0	6	0.13	
30	18.0	1	0.02	
31	20.0	0	0.00	
32	22.0	0	0.00	
33	24.0	0	0.00	
34	26.0	0	0.00	
35	28.0	0	0.00	
36	30.0	0	0.00	
37	32.0	0	0.00	
38	34.0	5	0.11	
39	36.0	0	0.00	
40	38.0	0	0.00	
41	40.0	0	0.00	
42	>40.0	0	0.00	

FIGURE 3.14

V15 NORTH

NO. OF POINTS = 4492 BIN SIZE = 2.0 CM/SEC

BIN	BOUND	FREQ	PERCENT	
1	<-40.0	0	0.00	
2	-38.0	0	0.00	
3	-36.0	0	0.00	
4	-34.0	0	0.00	
5	-32.0	0	0.00	
6	-30.0	0	0.00	
7	-28.0	0	0.00	
8	-26.0	0	0.00	
9	-24.0	0	0.00	
10	-22.0	1	0.02	
11	-20.0	1	0.02	
12	-18.0	0	0.00	
13	-16.0	0	0.00	
14	-14.0	1	0.02	
15	-12.0	10	0.22	
16	-10.0	51	1.14	X
17	-8.0	78	1.74	XX
18	-6.0	105	2.34	XX
19	-4.0	114	2.54	XXX
20	-2.0	145	3.23	XXX
21	0.0	217	4.83	XXXXX
22	2.0	277	6.17	XXXXXX
23	4.0	379	8.44	XXXXXXXX
24	6.0	431	9.59	XXXXXXXXXX
25	8.0	453	10.08	XXXXXXXXXX
26	10.0	552	12.29	XXXXXXXXXXXX
27	12.0	563	12.53	XXXXXXXXXXXX
28	14.0	519	11.55	XXXXXXXXXXXX
29	16.0	328	7.30	XXXXXXX
30	18.0	168	3.74	XXXX
31	20.0	58	1.29	X
32	22.0	30	0.67	X
33	24.0	9	0.20	
34	26.0	0	0.00	
35	28.0	1	0.02	
36	30.0	0	0.00	
37	32.0	0	0.00	
38	34.0	1	0.02	
39	36.0	0	0.00	
40	38.0	0	0.00	
41	40.0	0	0.00	
42	>40.0	0	0.00	

FIGURE 3.15

V15 TEMPERATURE

NO. OF POINTS = 4492 BIN SIZE = .1 DEG C

BIN	BOUND	FREQ	PERCENT	
1	<12.0	0	0.00	
2	12.1	0	0.00	
3	12.2	0	0.00	
4	12.3	0	0.00	
5	12.4	0	0.00	
6	12.5	0	0.00	
7	12.6	0	0.00	
8	12.7	0	0.00	
9	12.8	0	0.00	
10	12.9	0	0.00	
11	13.0	15	0.33	
12	13.1	59	1.31	X
13	13.2	88	1.96	XX
14	13.3	203	4.52	XXXXXX
15	13.4	307	6.83	XXXXXXXX
16	13.5	483	10.75	XXXXXXXXXXXXXX
17	13.6	696	15.49	XXXXXXXXXXXXXXXXXXXX
18	13.7	548	12.20	XXXXXXXXXXXXXXXXXX
19	13.8	502	11.18	XXXXXXXXXXXXXX
20	13.9	596	13.27	XXXXXXXXXXXXXXXXXXXX
21	14.0	366	8.15	XXXXXXXXXX
22	14.1	290	6.46	XXXXXXX
23	14.2	228	5.08	XXXXXX
24	14.3	76	1.69	XX
25	14.4	28	0.62	X
26	14.5	7	0.16	
27	14.6	0	0.00	
28	14.7	0	0.00	
29	14.8	0	0.00	
30	14.9	0	0.00	
31	15.0	0	0.00	
32	15.1	0	0.00	
33	15.2	0	0.00	
34	15.3	0	0.00	
35	15.4	0	0.00	
36	15.5	0	0.00	
37	15.6	0	0.00	
38	15.7	0	0.00	
39	15.8	0	0.00	
40	15.9	0	0.00	
41	16.0	0	0.00	
42	>16.0	0	0.00	

FIGURE 3.16

V23 EAST

NO. OF POINTS = 4302 BIN SIZE = 2.0 CM/SEC

BIN	BOUND	FREQ	PERCENT	
1	<-40.0	0	0.00	
2	-38.0	0	0.00	
3	-36.0	0	0.00	
4	-34.0	0	0.00	
5	-32.0	0	0.00	
6	-30.0	0	0.00	
7	-28.0	0	0.00	
8	-26.0	3	0.07	
9	-24.0	37	0.86	X
10	-22.0	59	1.37	X
11	-20.0	71	1.65	XX
12	-18.0	168	3.91	XXXX
13	-16.0	228	5.30	XXXXX
14	-14.0	383	8.90	XXXXXXXXXX
15	-12.0	543	12.62	XXXXXXXXXXXXXX
16	-10.0	491	11.41	XXXXXXXXXXXXXX
17	-8.0	507	11.79	XXXXXXXXXXXXXX
18	-6.0	529	12.30	XXXXXXXXXXXXXX
19	-4.0	411	9.55	XXXXXXXXXXXXXX
20	-2.0	322	7.48	XXXXXXX
21	0.0	281	6.53	XXXXXXX
22	2.0	137	3.18	XXX
23	4.0	65	1.51	XX
24	6.0	49	1.14	X
25	8.0	14	0.33	
26	10.0	3	0.07	
27	12.0	1	0.02	
28	14.0	0	0.00	
29	16.0	0	0.00	
30	18.0	0	0.00	
31	20.0	0	0.00	
32	22.0	0	0.00	
33	24.0	0	0.00	
34	26.0	0	0.00	
35	28.0	0	0.00	
36	30.0	0	0.00	
37	32.0	0	0.00	
38	34.0	0	0.00	
39	36.0	0	0.00	
40	38.0	0	0.00	
41	40.0	0	0.00	
42	>40.0	0	0.00	

FIGURE 3.17

V23 NORTH

NO. OF POINTS = 4302 BIN SIZE = 2.0 CM/SEC

BIN	BOUND	FREQ	PERCENT	
1	<-40.0	0	0.00	
2	-38.0	0	0.00	
3	-36.0	0	0.00	
4	-34.0	0	0.00	
5	-32.0	0	0.00	
6	-30.0	0	0.00	
7	-28.0	0	0.00	
8	-26.0	0	0.00	
9	-24.0	0	0.00	
10	-22.0	0	0.00	
11	-20.0	0	0.00	
12	-18.0	0	0.00	
13	-16.0	0	0.00	
14	-14.0	0	0.00	
15	-12.0	0	0.00	
16	-10.0	1	0.02	
17	-8.0	8	0.19	
18	-6.0	31	0.72	X
19	-4.0	140	3.25	XXX
20	-2.0	255	5.93	XXXXXX
21	0.0	272	6.32	XXXXXX
22	2.0	371	8.62	XXXXXXXXXX
23	4.0	473	10.99	XXXXXXXXXXXX
24	6.0	550	12.78	XXXXXXXXXXXXXX
25	8.0	583	13.55	XXXXXXXXXXXXXXXX
26	10.0	511	11.88	XXXXXXXXXXXXXX
27	12.0	509	11.83	XXXXXXXXXXXXXX
28	14.0	327	7.60	XXXXXXXXXX
29	16.0	159	3.70	XXXXX
30	18.0	91	2.12	XX
31	20.0	19	0.44	
32	22.0	2	0.05	
33	24.0	0	0.00	
34	26.0	0	0.00	
35	28.0	0	0.00	
36	30.0	0	0.00	
37	32.0	0	0.00	
38	34.0	0	0.00	
39	36.0	0	0.00	
40	38.0	0	0.00	
41	40.0	0	0.00	
42	>40.0	0	0.00	

FIGURE 3.18

V23 TEMPERATURE

NO. OF POINTS - 4302 BIN SIZE - .1 DEG C

BIN	BOUND	FREQ	PERCENT	
1	<13.0	0	0.00	
2	13.1	0	0.00	
3	13.2	0	0.00	
4	13.3	0	0.00	
5	13.4	0	0.00	
6	13.5	0	0.00	
7	13.6	0	0.00	
8	13.7	0	0.00	
9	13.8	0	0.00	
10	13.9	3	0.07	
11	14.0	8	0.19	
12	14.1	9	0.21	
13	14.2	46	1.07	X
14	14.3	215	5.00	XXXXXX
15	14.4	431	10.02	XXXXXXXXXXXX
16	14.5	532	12.37	XXXXXXXXXXXXXXXX
17	14.6	683	15.88	XXXXXXXXXXXXXXXXXXXX
18	14.7	614	14.27	XXXXXXXXXXXXXXXXXXXX
19	14.8	574	13.34	XXXXXXXXXXXXXXXXXXXX
20	14.9	549	12.76	XXXXXXXXXXXXXXXXXXXX
21	15.0	352	8.18	XXXXXXXXXX
22	15.1	204	4.74	XXXXXX
23	15.2	59	1.37	X
24	15.3	7	0.16	
25	15.4	13	0.30	
26	15.5	3	0.07	
27	15.6	0	0.00	
28	15.7	0	0.00	
29	15.8	0	0.00	
30	15.9	0	0.00	
31	16.0	0	0.00	
32	16.1	0	0.00	
33	16.2	0	0.00	
34	16.3	0	0.00	
35	16.4	0	0.00	
36	16.5	0	0.00	
37	16.6	0	0.00	
38	16.7	0	0.00	
39	16.8	0	0.00	
40	16.9	0	0.00	
41	17.0	0	0.00	
42	>17.0	0	0.00	

FIGURE 3.19

V25 EAST

NO. OF POINTS = 4302 BIN SIZE = 2.0 CM/SEC

BIN	BOUND	FREQ	PERCENT	
1	<-40.0	0	0.00	
2	-38.0	0	0.00	
3	-36.0	0	0.00	
4	-34.0	0	0.00	
5	-32.0	0	0.00	
6	-30.0	0	0.00	
7	-28.0	0	0.00	
8	-26.0	10	0.23	
9	-24.0	27	0.63	X
10	-22.0	39	0.91	X
11	-20.0	88	2.05	XX
12	-18.0	136	3.16	XXX
13	-16.0	127	2.95	XXX
14	-14.0	183	4.25	XXXX
15	-12.0	221	5.14	XXXXX
16	-10.0	224	5.21	XXXXX
17	-8.0	272	6.32	XXXXXX
18	-6.0	188	4.37	XXXX
19	-4.0	171	3.97	XXXX
20	-2.0	177	4.11	XXXX
21	0.0	210	4.88	XXXXX
22	2.0	1953	45.40	XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
23	4.0	80	1.86	XX
24	6.0	40	0.93	X
25	8.0	44	1.02	X
26	10.0	58	1.35	X
27	12.0	33	0.77	X
28	14.0	16	0.37	
29	16.0	3	0.07	
30	18.0	2	0.05	
31	20.0	0	0.00	
32	22.0	0	0.00	
33	24.0	0	0.00	
34	26.0	0	0.00	
35	28.0	0	0.00	
36	30.0	0	0.00	
37	32.0	0	0.00	
38	34.0	0	0.00	
39	36.0	0	0.00	
40	38.0	0	0.00	
41	40.0	0	0.00	
42	>40.0	0	0.00	

FIGURE 3.20

V25 NORTH

NO. OF POINTS = 4302 BIN SIZE = 2.0 CM/SEC

BIN	BOUND	FREQ	PERCENT	
1	<-40.0	0	0.00	
2	-38.0	0	0.00	
3	-36.0	0	0.00	
4	-34.0	0	0.00	
5	-32.0	0	0.00	
6	-30.0	0	0.00	
7	-28.0	0	0.00	
8	-26.0	0	0.00	
9	-24.0	0	0.00	
10	-22.0	0	0.00	
11	-20.0	0	0.00	
12	-18.0	0	0.00	
13	-16.0	0	0.00	
14	-14.0	0	0.00	
15	-12.0	10	0.23	
16	-10.0	35	0.81	X
17	-8.0	60	1.39	X
18	-6.0	82	1.91	XX
19	-4.0	98	2.28	XX
20	-2.0	154	3.58	XXXX
21	0.0	311	7.23	XXXXXXXX
22	2.0	2073	48.19	XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
23	4.0	331	7.69	XXXXXXXXXX
24	6.0	283	6.58	XXXXXXXXXX
25	8.0	275	6.39	XXXXXXXXXX
26	10.0	252	5.86	XXXXXXXXXX
27	12.0	190	4.42	XXXX
28	14.0	99	2.30	XX
29	16.0	35	0.81	X
30	18.0	8	0.19	
31	20.0	6	0.14	
32	22.0	0	0.00	
33	24.0	0	0.00	
34	26.0	0	0.00	
35	28.0	0	0.00	
36	30.0	0	0.00	
37	32.0	0	0.00	
38	34.0	0	0.00	
39	36.0	0	0.00	
40	38.0	0	0.00	
41	40.0	0	0.00	
42	>40.0	0	0.00	

FIGURE 3.21

V25 TEMPERATURE

NO. OF POINTS = 4302 BIN SIZE = .1 DEG C

BIN	BOUND	FREQ	PERCENT	
1	<12.0	0	0.00	
2	12.1	0	0.00	
3	12.2	0	0.00	
4	12.3	0	0.00	
5	12.4	0	0.00	
6	12.5	0	0.00	
7	12.6	0	0.00	
8	12.7	0	0.00	
9	12.8	0	0.00	
10	12.9	0	0.00	
11	13.0	27	0.63	X
12	13.1	20	0.46	
13	13.2	21	0.49	
14	13.3	26	0.60	X
15	13.4	69	1.60	XX
16	13.5	144	3.35	XXX
17	13.6	258	6.00	XXXXXX
18	13.7	338	7.86	XXXXXXXX
19	13.8	557	12.95	XXXXXXXXXXXXXXXX
20	13.9	591	13.74	XXXXXXXXXXXXXXXX
21	14.0	615	14.30	XXXXXXXXXXXXXXXX
22	14.1	526	12.23	XXXXXXXXXXXXXXXX
23	14.2	447	10.39	XXXXXXXXXX
24	14.3	292	6.79	XXXXXXX
25	14.4	158	3.67	XXXXX
26	14.5	104	2.42	XX
27	14.6	59	1.37	X
28	14.7	37	0.86	X
29	14.8	11	0.26	
30	14.9	2	0.05	
31	15.0	0	0.00	
32	15.1	0	0.00	
33	15.2	0	0.00	
34	15.3	0	0.00	
35	15.4	0	0.00	
36	15.5	0	0.00	
37	15.6	0	0.00	
38	15.7	0	0.00	
39	15.8	0	0.00	
40	15.9	0	0.00	
41	16.0	0	0.00	
42	>16.0	0	0.00	

FIGURE 3.22

V26 EAST

NO. OF POINTS = 4303 BIN SIZE = 2.0 CM/SEC

BIN	BOUND	FREQ	PERCENT	
1	<-40.0	0	0.00	
2	-38.0	0	0.00	
3	-36.0	0	0.00	
4	-34.0	0	0.00	
5	-32.0	0	0.00	
6	-30.0	0	0.00	
7	-28.0	0	0.00	
8	-26.0	6	0.14	
9	-24.0	8	0.19	
10	-22.0	13	0.30	
11	-20.0	24	0.56	X
12	-18.0	43	1.00	X
13	-16.0	97	2.25	XX
14	-14.0	101	2.35	XX
15	-12.0	179	4.16	XXXX
16	-10.0	338	7.85	XXXXXXXX
17	-8.0	340	7.90	XXXXXXXX
18	-6.0	428	9.95	XXXXXXXXXX
19	-4.0	429	9.97	XXXXXXXXXX
20	-2.0	335	7.79	XXXXXXXX
21	0.0	260	6.04	XXXXXX
22	2.0	295	6.86	XXXXXX
23	4.0	312	7.25	XXXXXX
24	6.0	272	6.32	XXXXXX
25	8.0	258	6.00	XXXXXX
26	10.0	216	5.02	XXXXX
27	12.0	131	3.04	XXX
28	14.0	107	2.49	XX
29	16.0	61	1.42	X
30	18.0	32	0.74	X
31	20.0	16	0.37	
32	22.0	2	0.05	
33	24.0	0	0.00	
34	26.0	0	0.00	
35	28.0	0	0.00	
36	30.0	0	0.00	
37	32.0	0	0.00	
38	34.0	0	0.00	
39	36.0	0	0.00	
40	38.0	0	0.00	
41	40.0	0	0.00	
42	>40.0	0	0.00	

FIGURE 3.23

V26 NORTH

NO. OF POINTS = 4303 BIN SIZE = 2.0 CM/SEC

BIN	BOUND	FREQ	PERCENT	
1	<-40.0	0	0.00	
2	-38.0	0	0.00	
3	-36.0	0	0.00	
4	-34.0	0	0.00	
5	-32.0	0	0.00	
6	-30.0	0	0.00	
7	-28.0	0	0.00	
8	-26.0	0	0.00	
9	-24.0	0	0.00	
10	-22.0	0	0.00	
11	-20.0	0	0.00	
12	-18.0	0	0.00	
13	-16.0	0	0.00	
14	-14.0	0	0.00	
15	-12.0	0	0.00	
16	-10.0	5	0.12	
17	-8.0	15	0.35	
18	-6.0	65	1.51	XX
19	-4.0	234	5.44	XXXXX
20	-2.0	674	15.66	XXXXXXXXXXXXXXXXXXXX
21	0.0	1097	25.49	XXXXXXXXXXXXXXXXXXXXXXXXXXXX
22	2.0	844	19.61	XXXXXXXXXXXXXXXXXXXXXXXXXXXX
23	4.0	506	11.76	XXXXXXXXXXXXXX
24	6.0	274	6.37	XXXXXX
25	8.0	141	3.28	XXX
26	10.0	96	2.23	XX
27	12.0	77	1.79	XX
28	14.0	62	1.44	X
29	16.0	45	1.05	X
30	18.0	45	1.05	X
31	20.0	32	0.74	X
32	22.0	42	0.98	X
33	24.0	18	0.42	
34	26.0	16	0.37	
35	28.0	8	0.19	
36	30.0	3	0.07	
37	32.0	3	0.07	
38	34.0	1	0.02	
39	36.0	0	0.00	
40	38.0	0	0.00	
41	40.0	0	0.00	
42	>40.0	0	0.00	

FIGURE 3.24

V26 TEMPERATURE

NO. OF POINTS - 4303 BIN SIZE - .1 DEG C

BIN	BOUND	FREQ	PERCENT	
1	<9.0	0	0.00	
2	9.1	0	0.00	
3	9.2	0	0.00	
4	9.3	0	0.00	
5	9.4	0	0.00	
6	9.5	0	0.00	
7	9.6	0	0.00	
8	9.7	0	0.00	
9	9.8	1	0.02	
10	9.9	3	0.07	
11	10.0	17	0.40	
12	10.1	18	0.42	
13	10.2	21	0.49	
14	10.3	44	1.02	X
15	10.4	96	2.23	XX
16	10.5	99	2.30	XX
17	10.6	99	2.30	XX
18	10.7	126	2.93	XXX
19	10.8	132	3.07	XXX
20	10.9	241	5.60	XXXXXXX
21	11.0	229	5.32	XXXXXX
22	11.1	236	5.48	XXXXXX
23	11.2	250	5.81	XXXXXXX
24	11.3	312	7.25	XXXXXXXX
25	11.4	326	7.58	XXXXXXXXX
26	11.5	333	7.74	XXXXXXXXX
27	11.6	477	11.09	XXXXXXXXXXXX
28	11.7	286	6.65	XXXXXXXX
29	11.8	218	5.07	XXXXXX
30	11.9	195	4.53	XXXXXX
31	12.0	202	4.69	XXXXXX
32	12.1	114	2.65	XXX
33	12.2	58	1.35	X
34	12.3	62	1.44	X
35	12.4	51	1.19	X
36	12.5	25	0.58	X
37	12.6	12	0.28	
38	12.7	12	0.28	
39	12.8	5	0.12	
40	12.9	3	0.07	
41	13.0	0	0.00	
42	>13.0	0	0.00	

FIGURE 3.25

V11

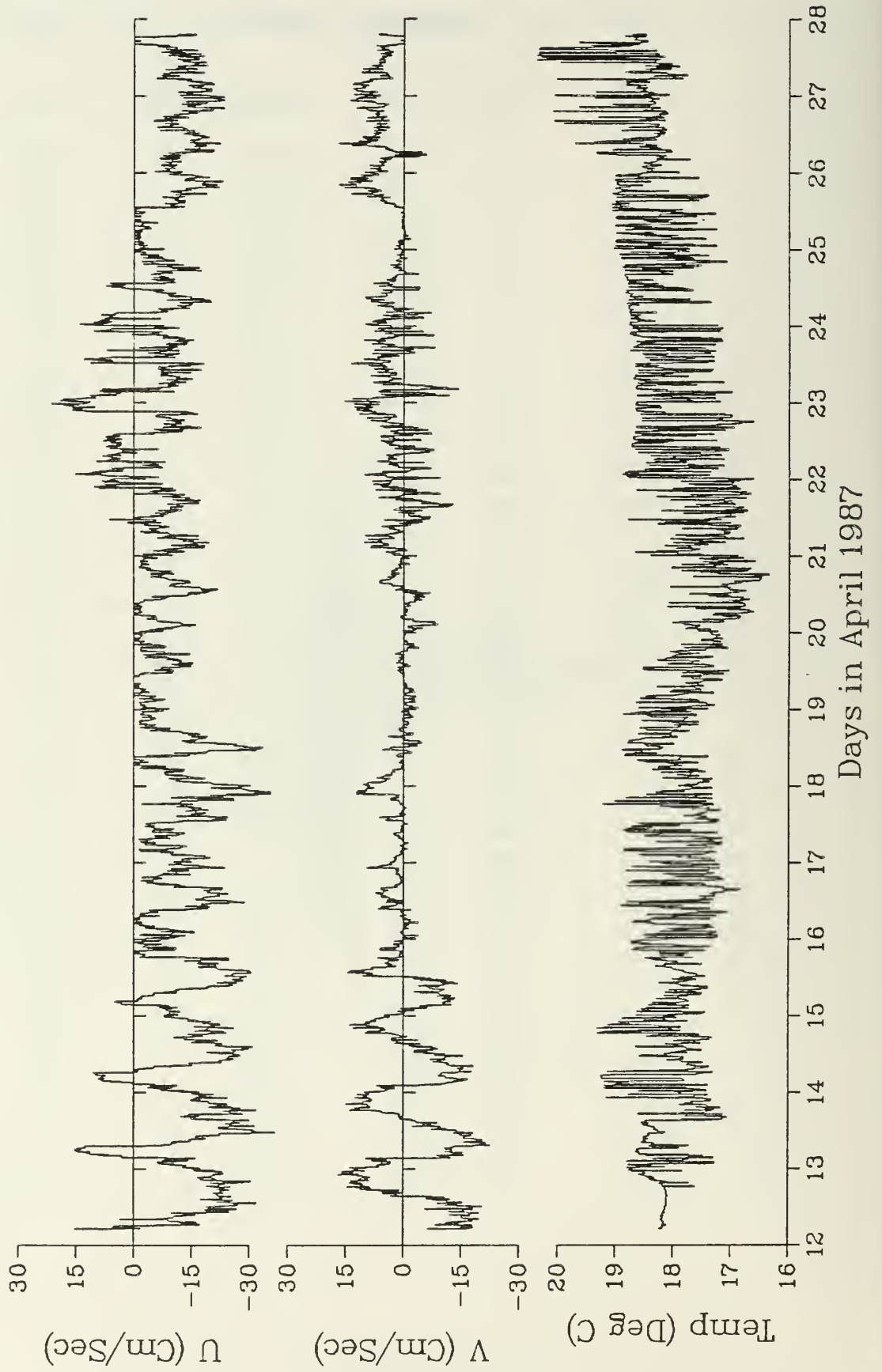


FIGURE 3.26

V12

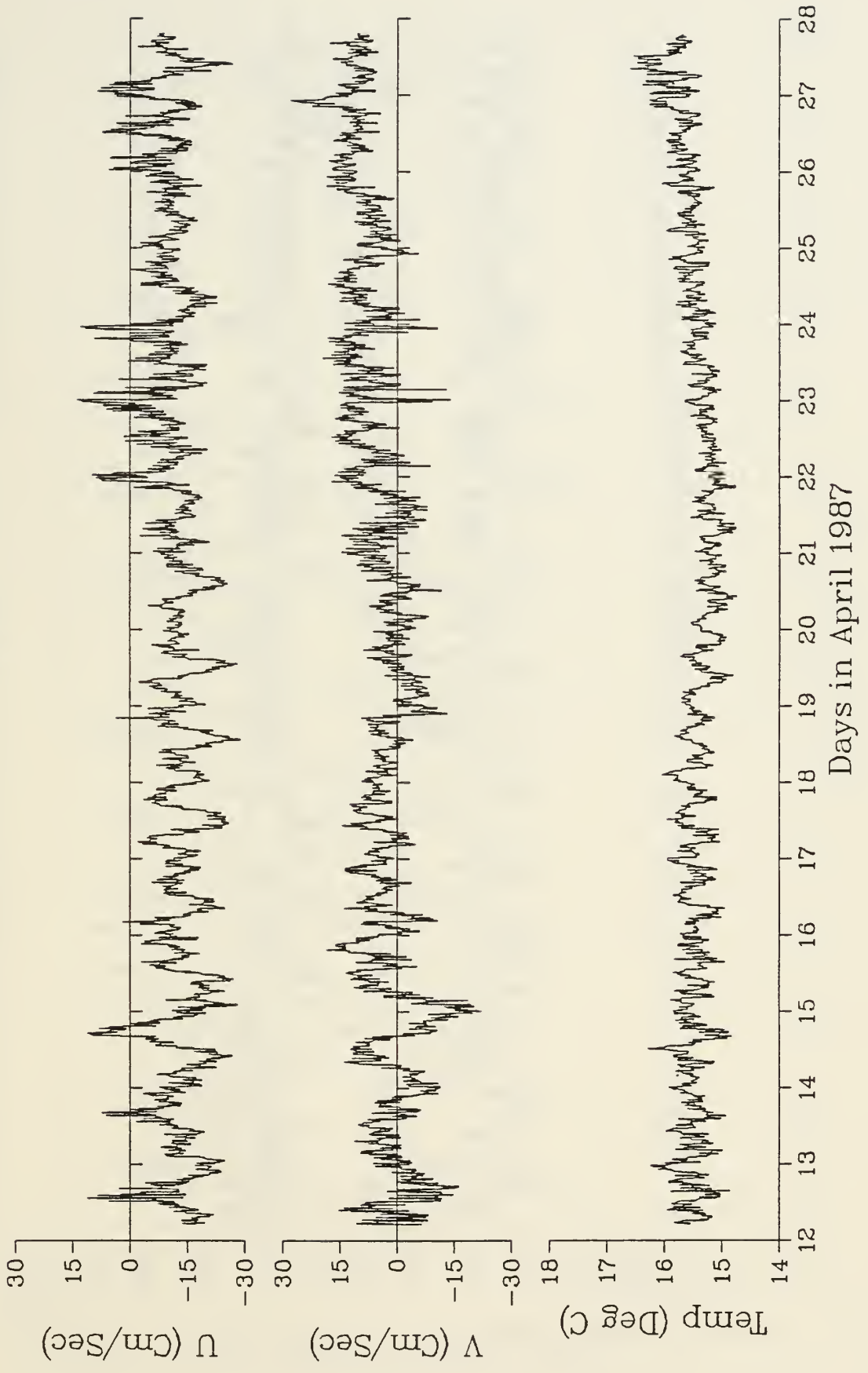


FIGURE 3.27

V13

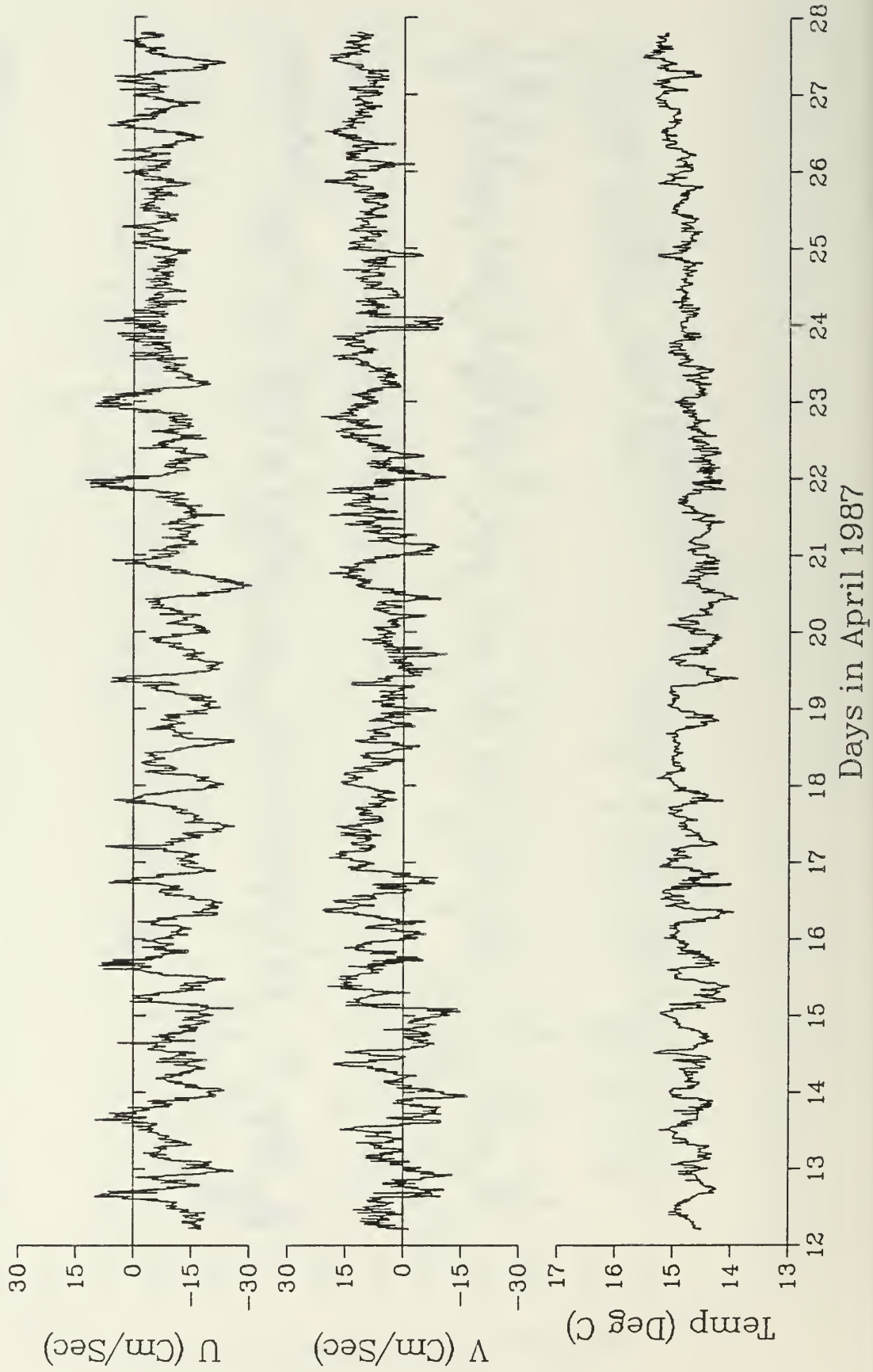
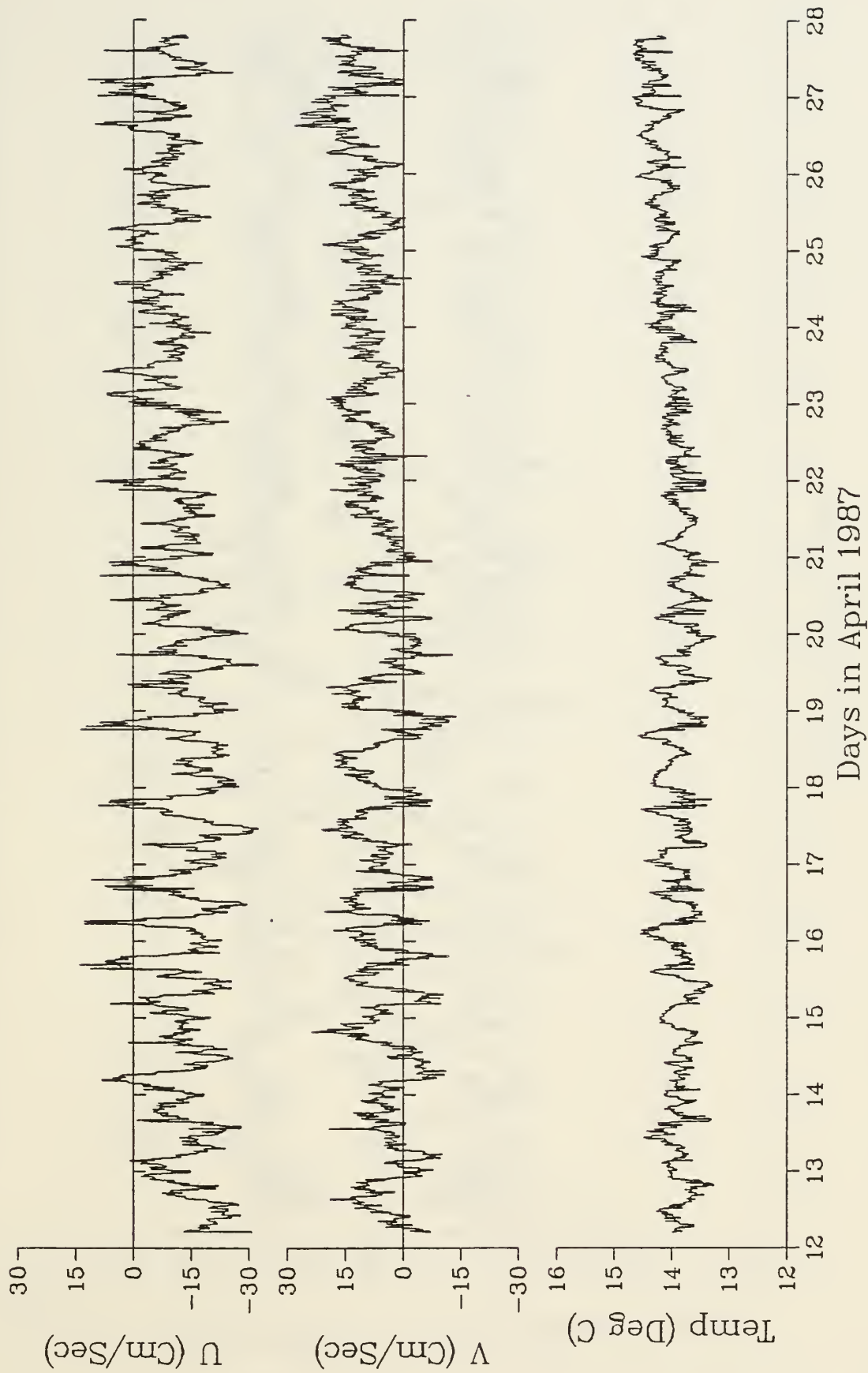


FIGURE 3.28

V14



V15

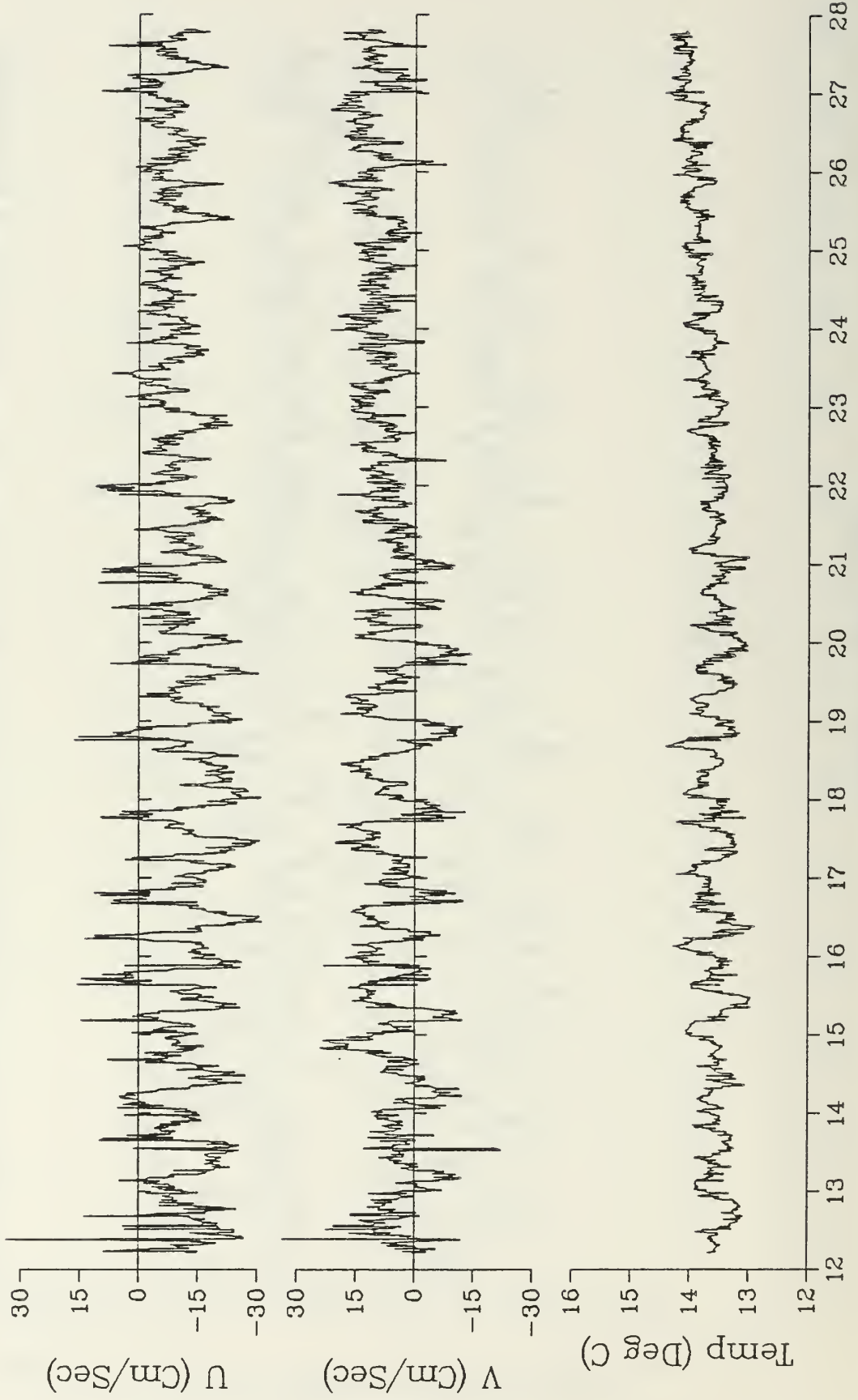


FIGURE 3.30

V23

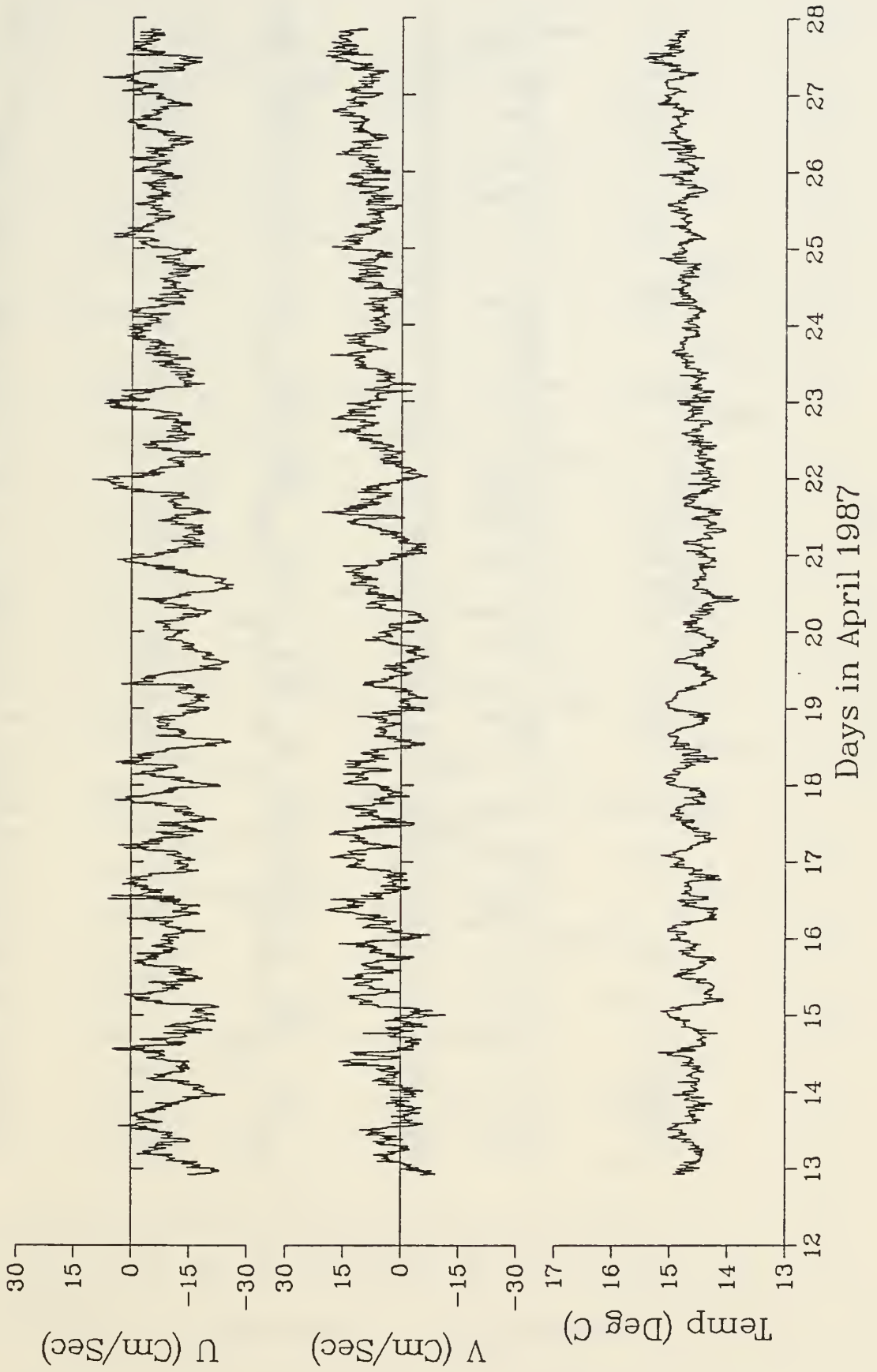


FIGURE 3.31

V25

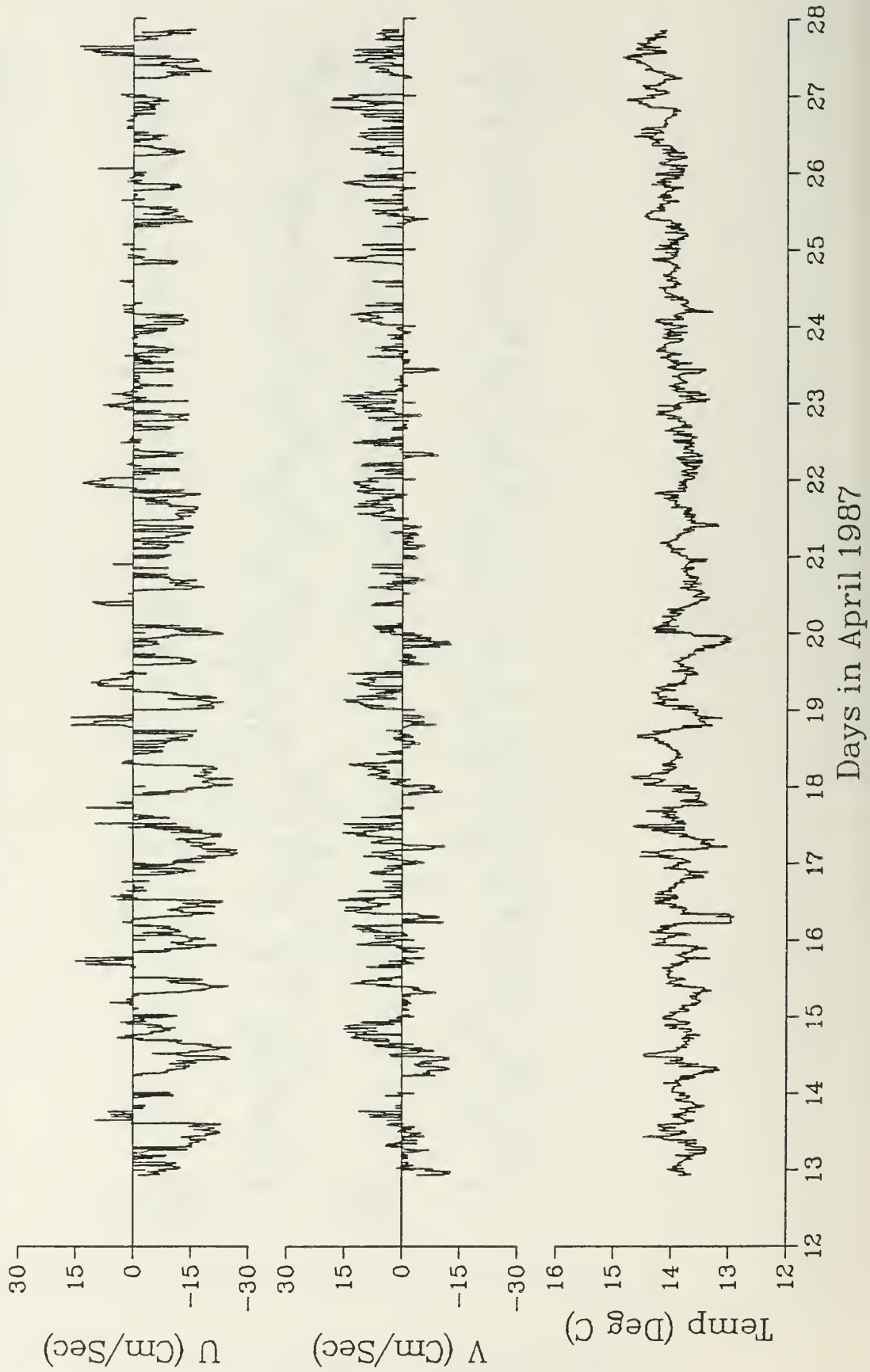
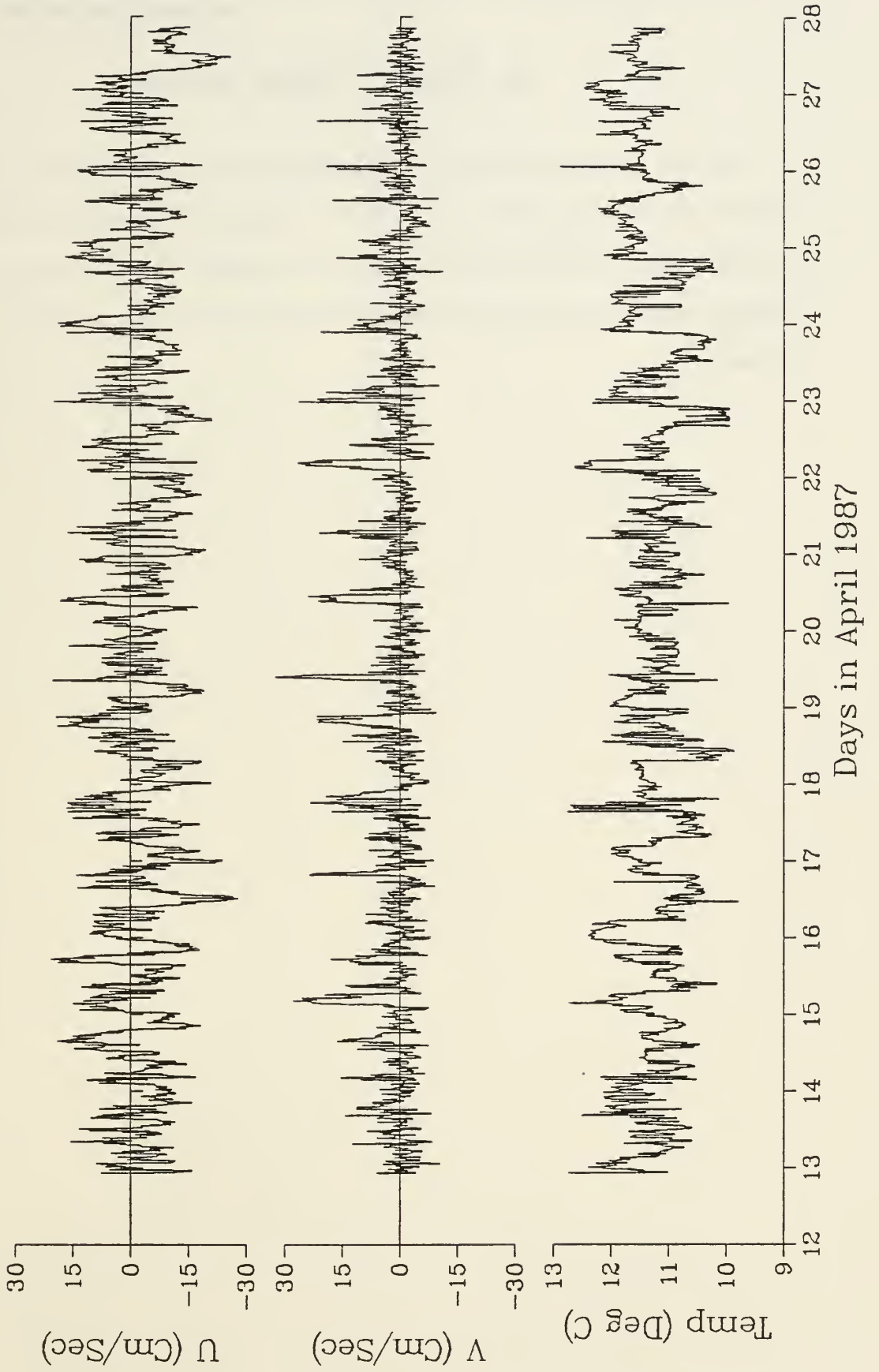


FIGURE 3.32

V26



4. Hourly Time Series

The raw velocity component and temperature data were truncated by the window of 2330 GMT 12 April 1987 to 1330 GMT 27 April 1987 to account for differences in the deployment and recovery times of the two moorings. The hourly vector averaged velocity components and scalar averaged temperature time series are shown in Figure 4 on page 43.

Figure 4. Figures 4.1 - 4.8: Hourly vector averaged time series of the velocity components and temperature.

FIGURE 4.1

V11

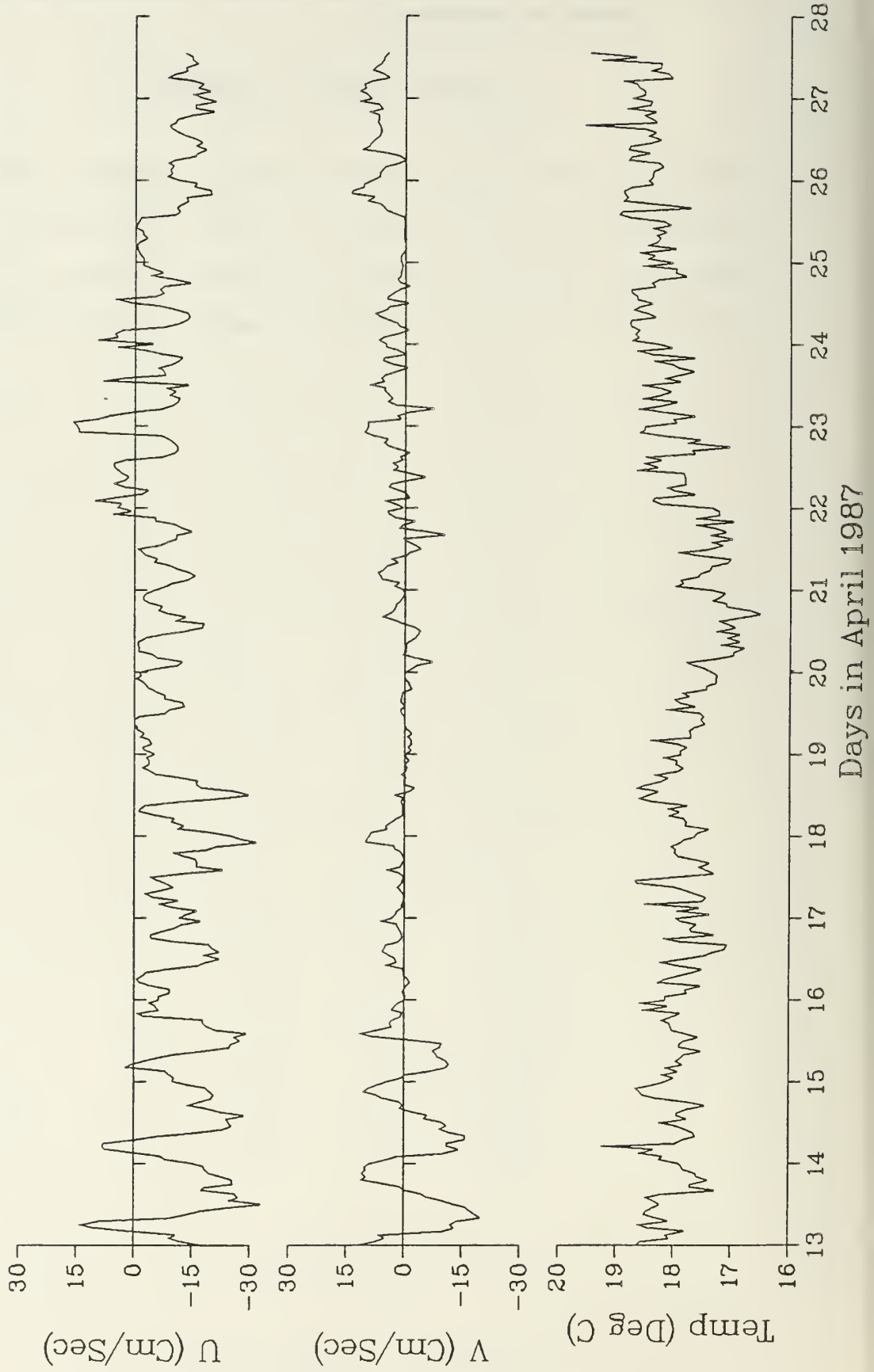


FIGURE 4.2

V12

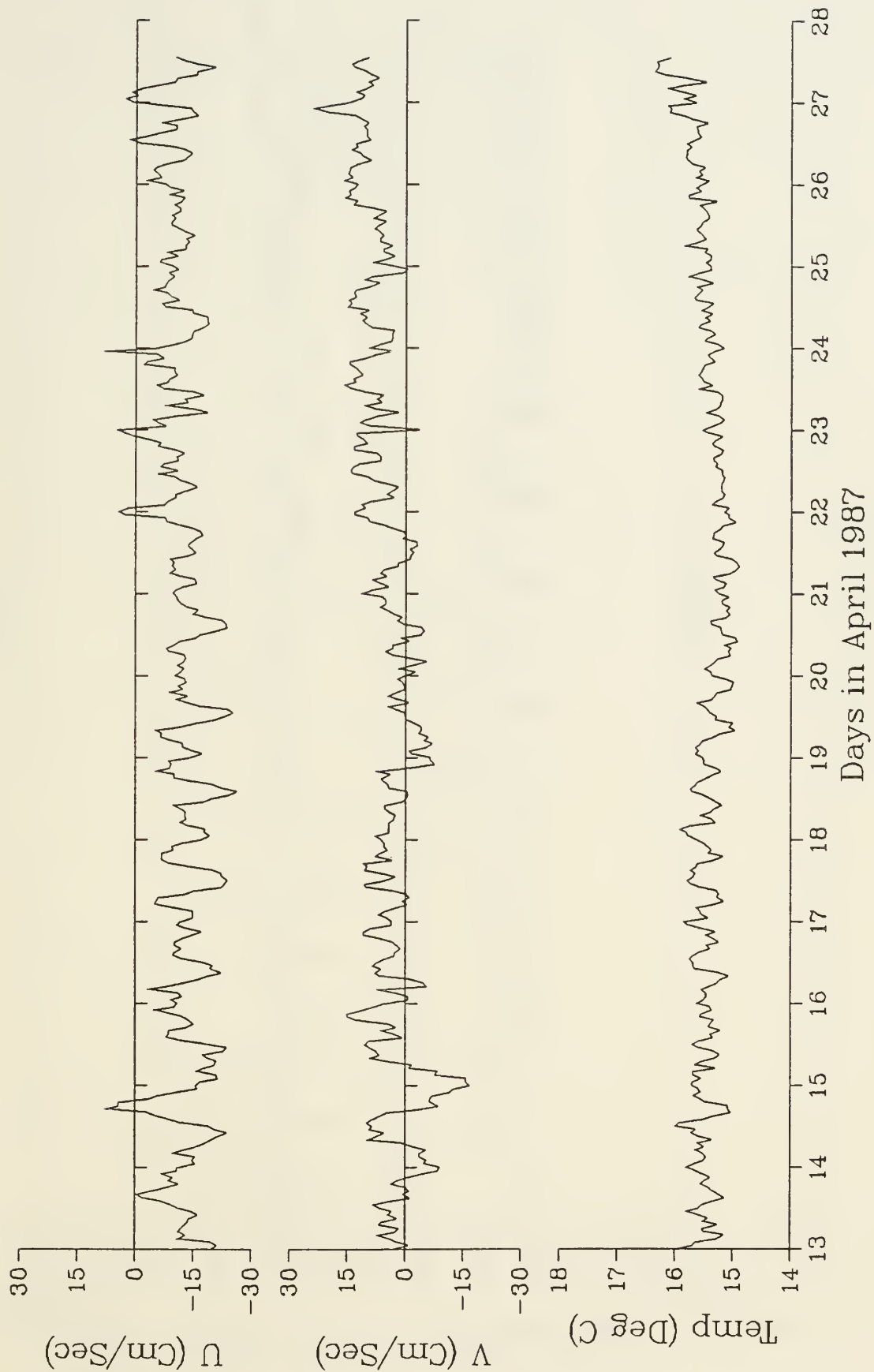


FIGURE 4.3

V13

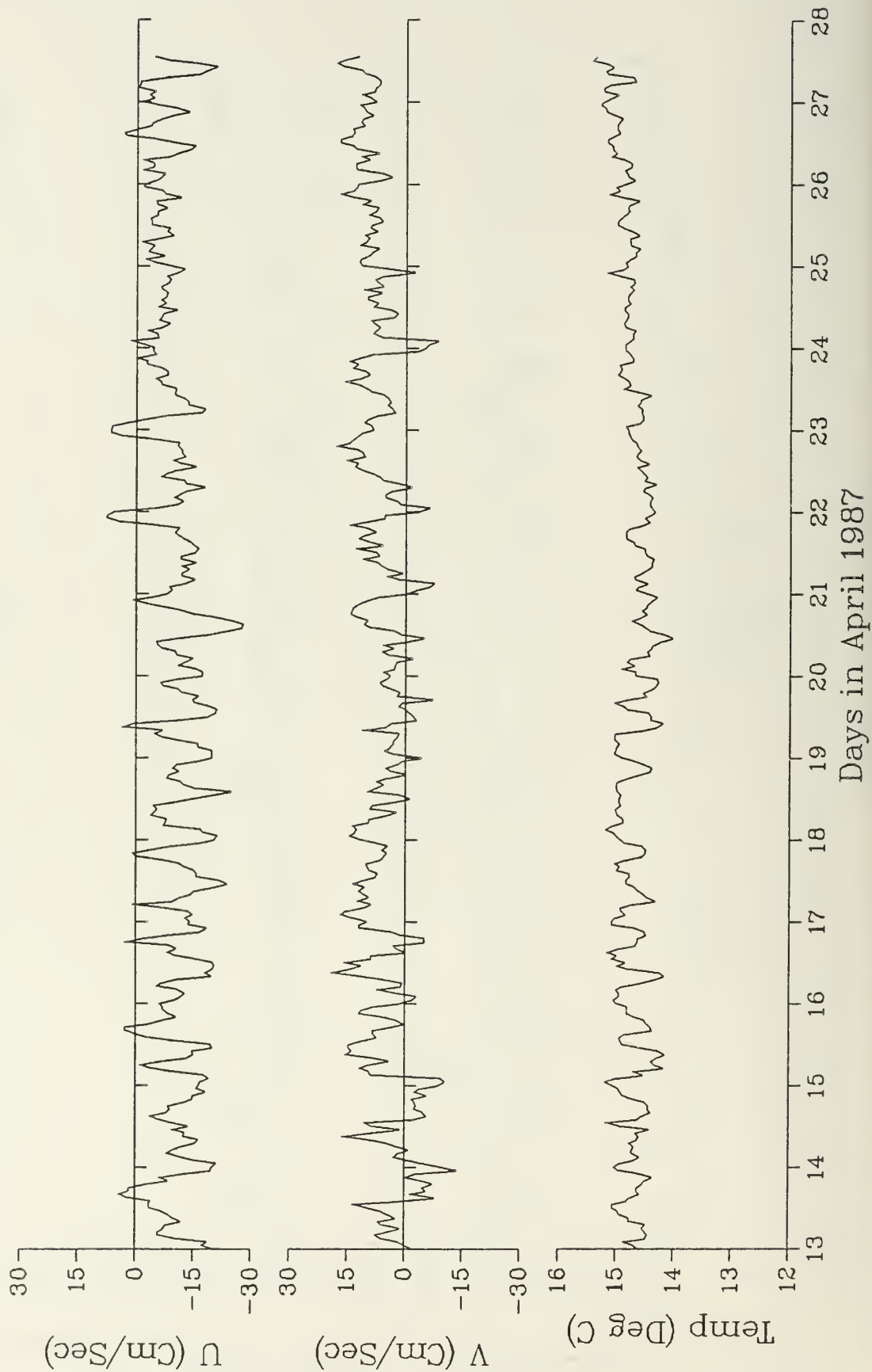


FIGURE 4.4

V14

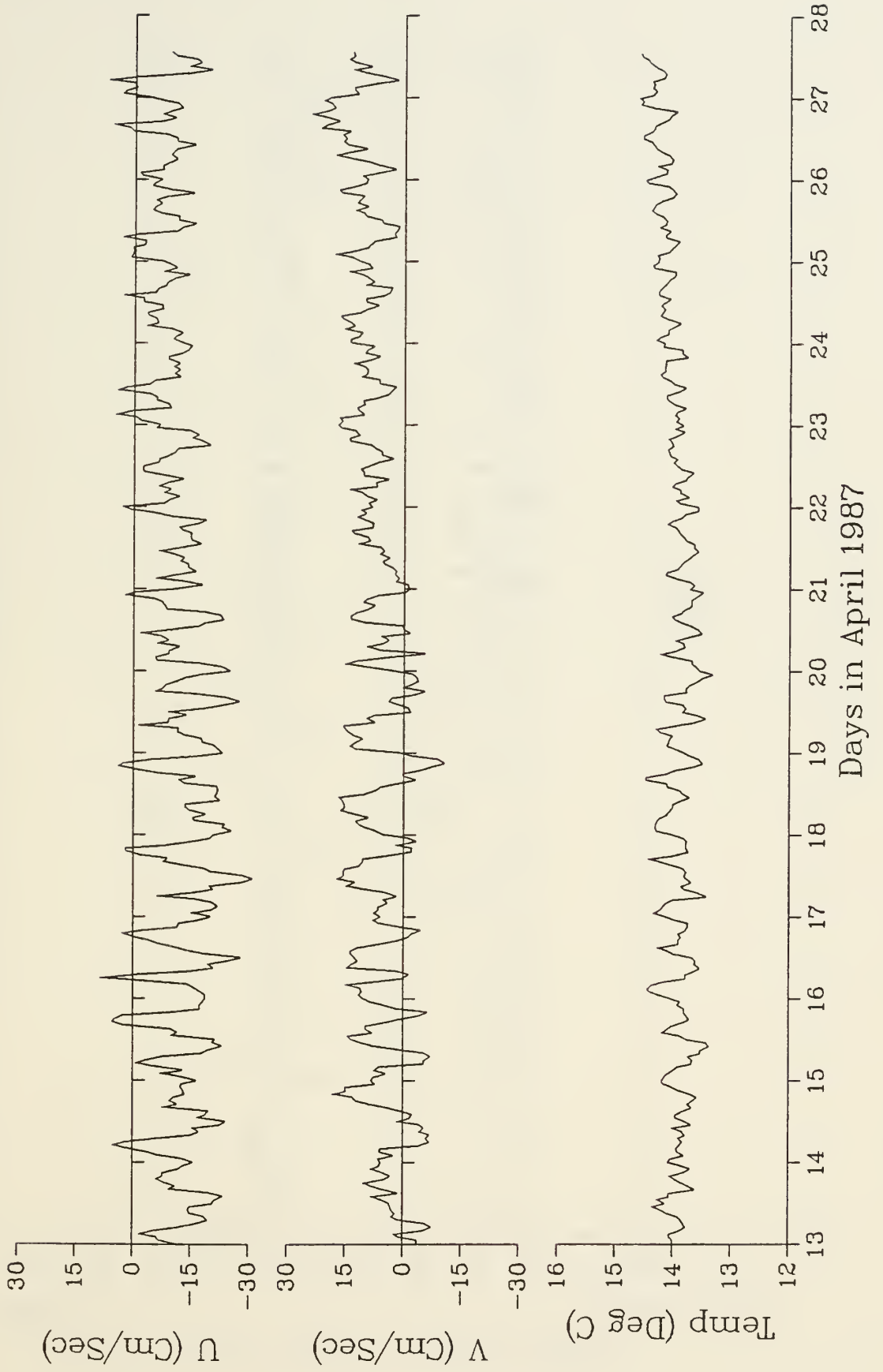
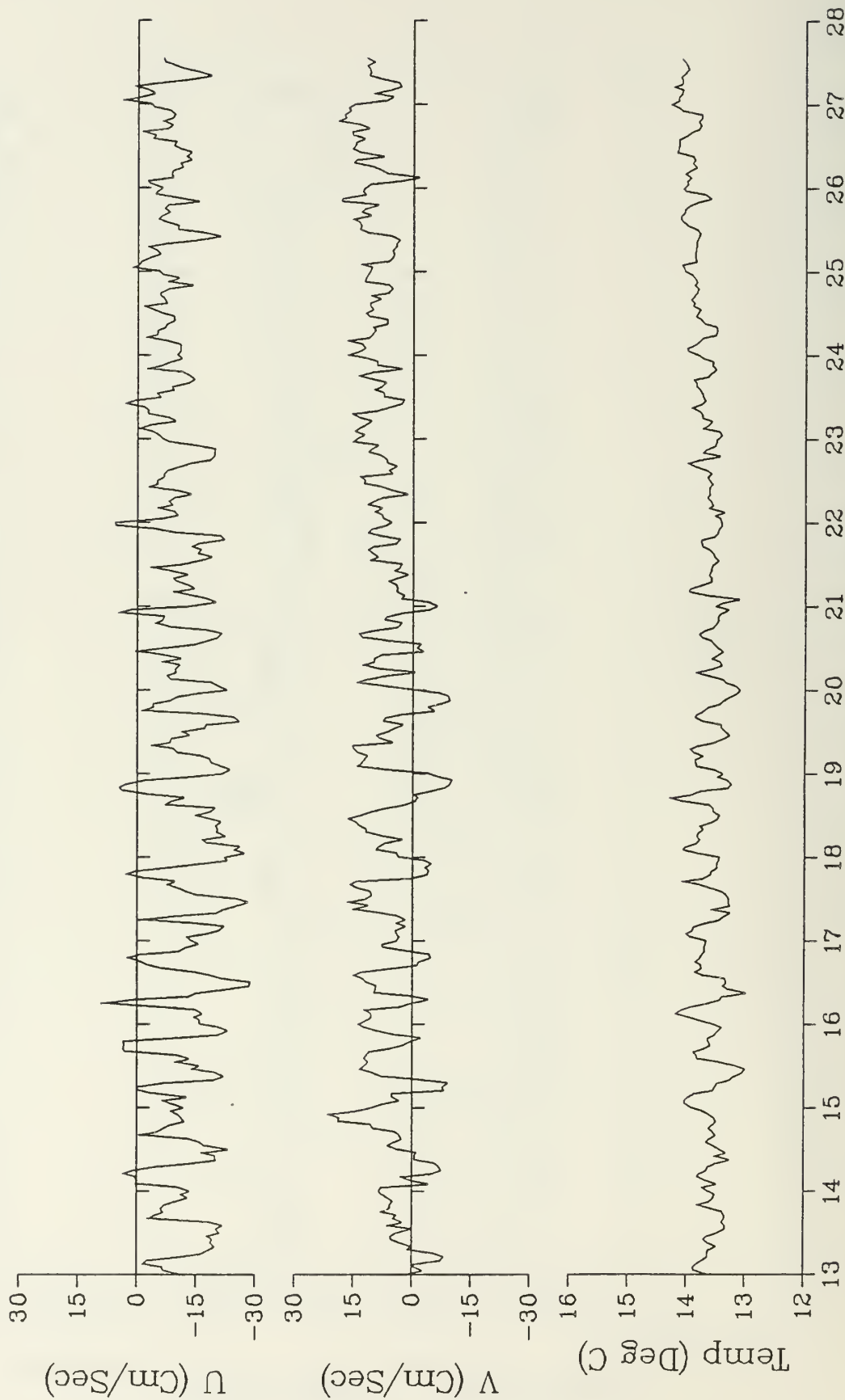


FIGURE 4.5

V15



Days in April 1987

FIGURE 4.6

V23

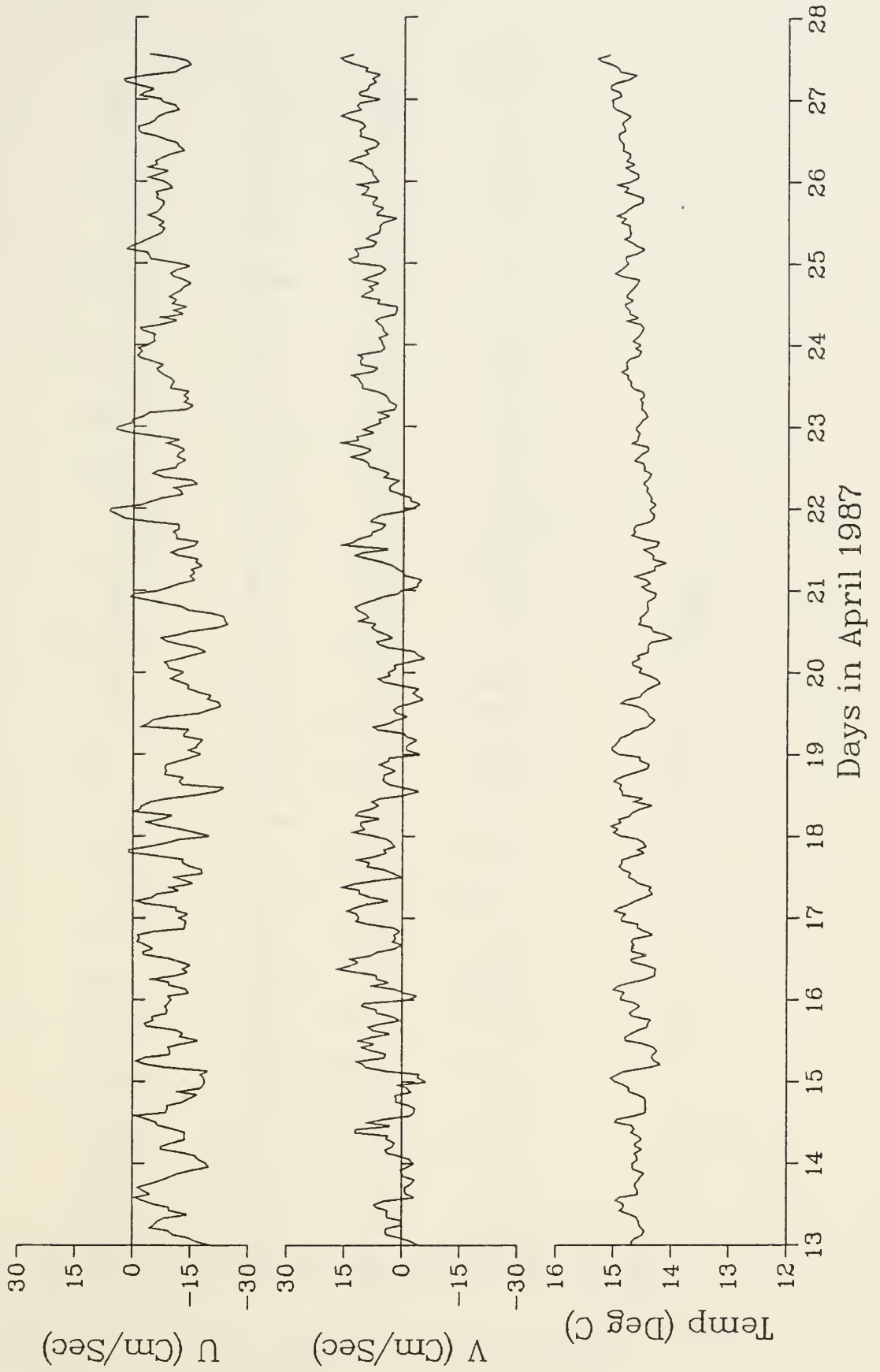


FIGURE 4.7

V25

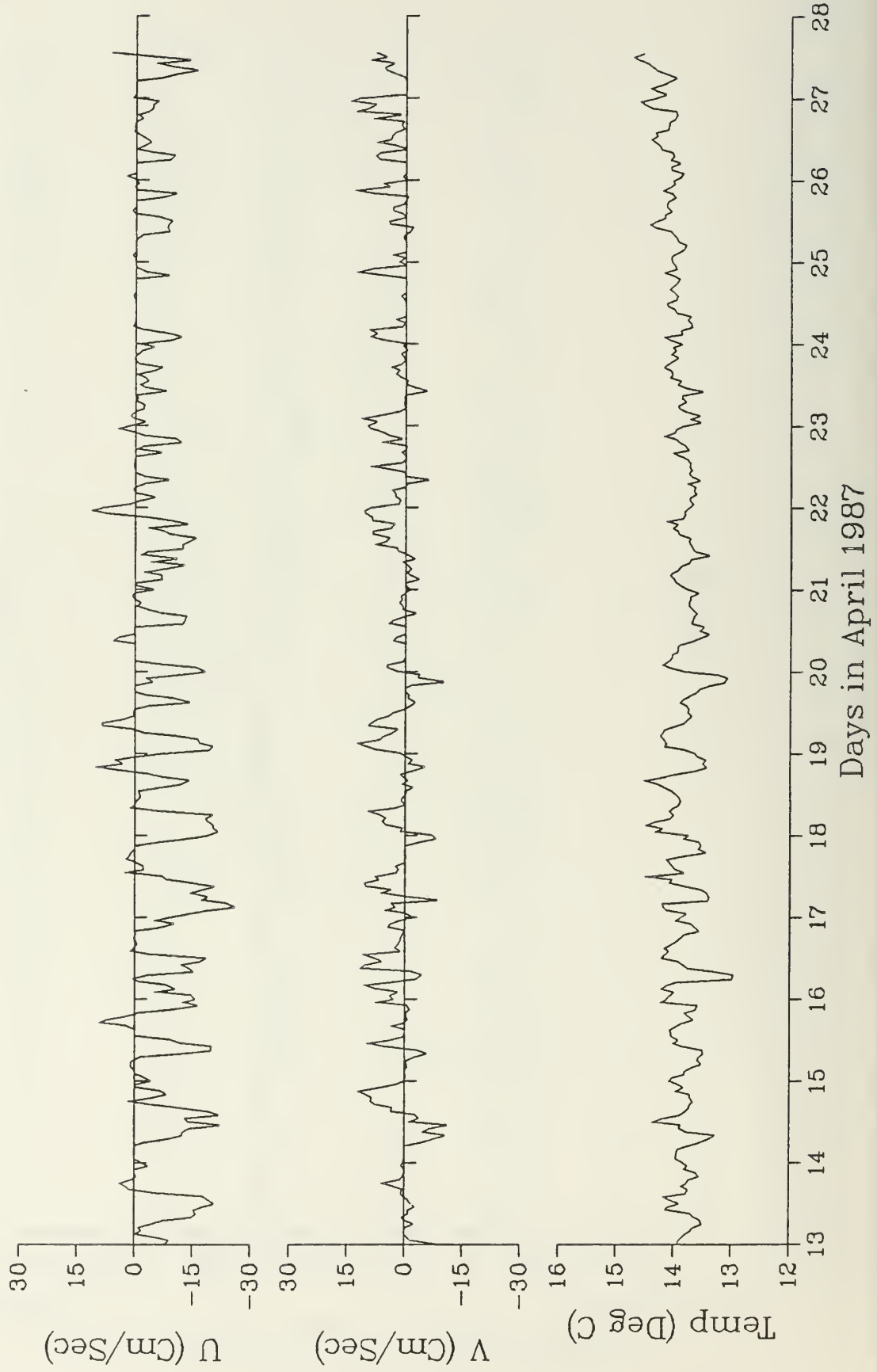
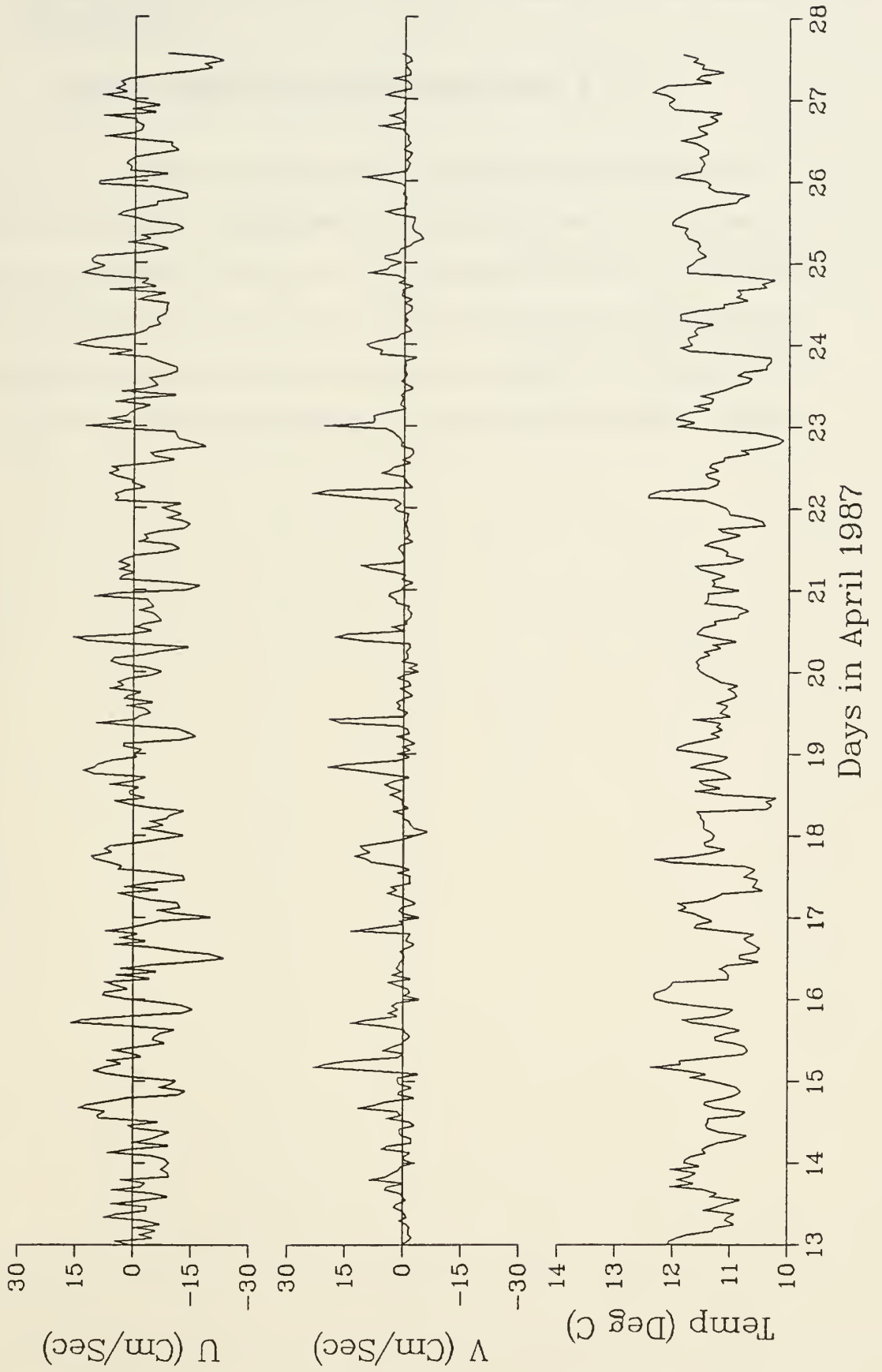


FIGURE 4.8

V26



5. Low Pass Filtered Time Series

The raw data were truncated as before to account for differences in the deployment and recovery of the moorings and for the filtering scheme. The records therefore begin at 2330 GMT 12 April 1987 and end at 1130 27 April 1987. The data were then low pass filtered using a ten percent cosine taper function with a six-hour sampling period and the resultant values were divided by .86 to correct for the reduction in magnitude caused by the filter. A cubic spline was applied to the filtered data as shown in Figure 5 on page 53.

Figure 5. Figures 5.1 - 5.8: Time series of the low pass filtered velocity components and temperature.

FIGURE 5.1

V11

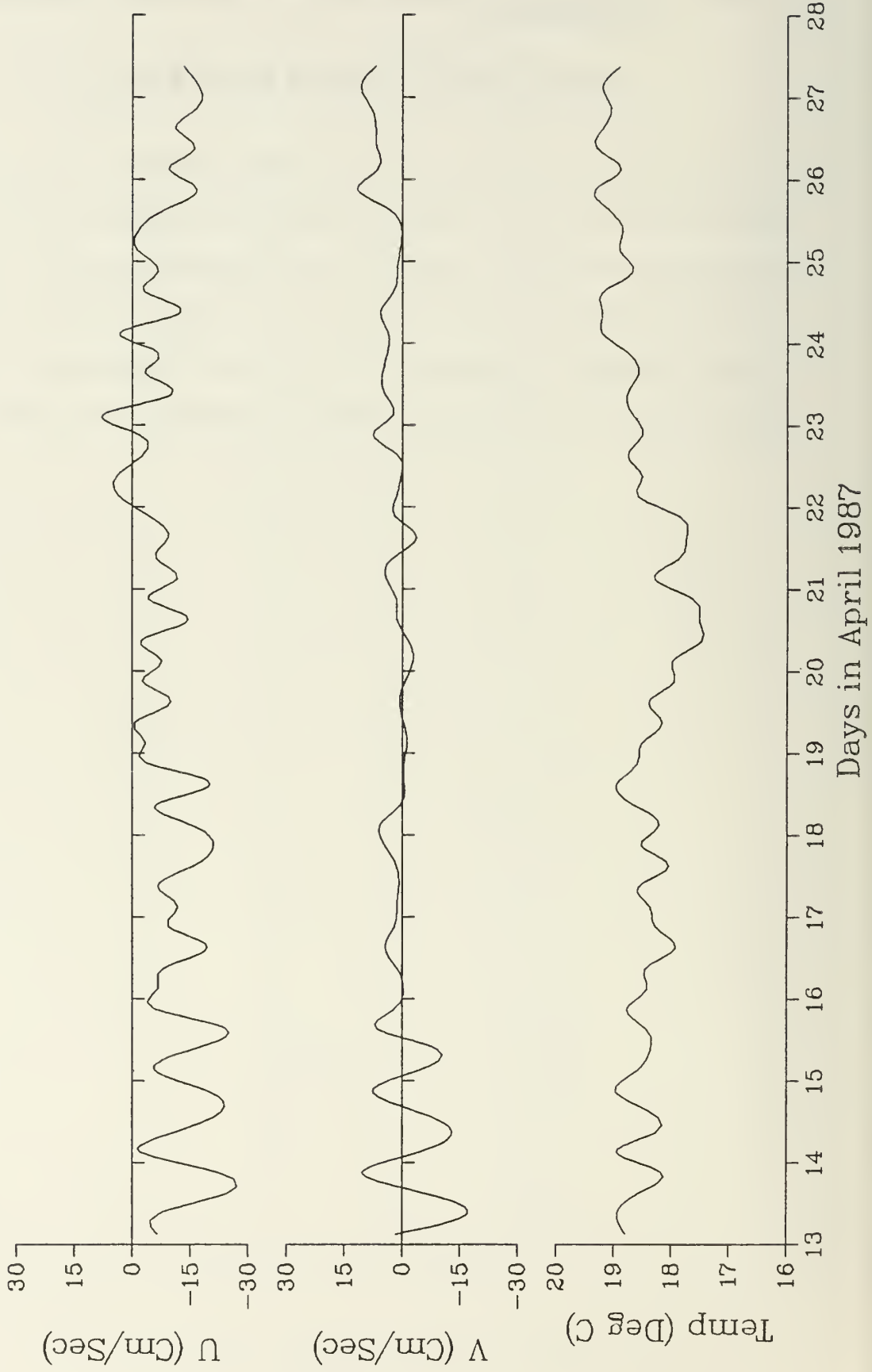


FIGURE 5.2

V12

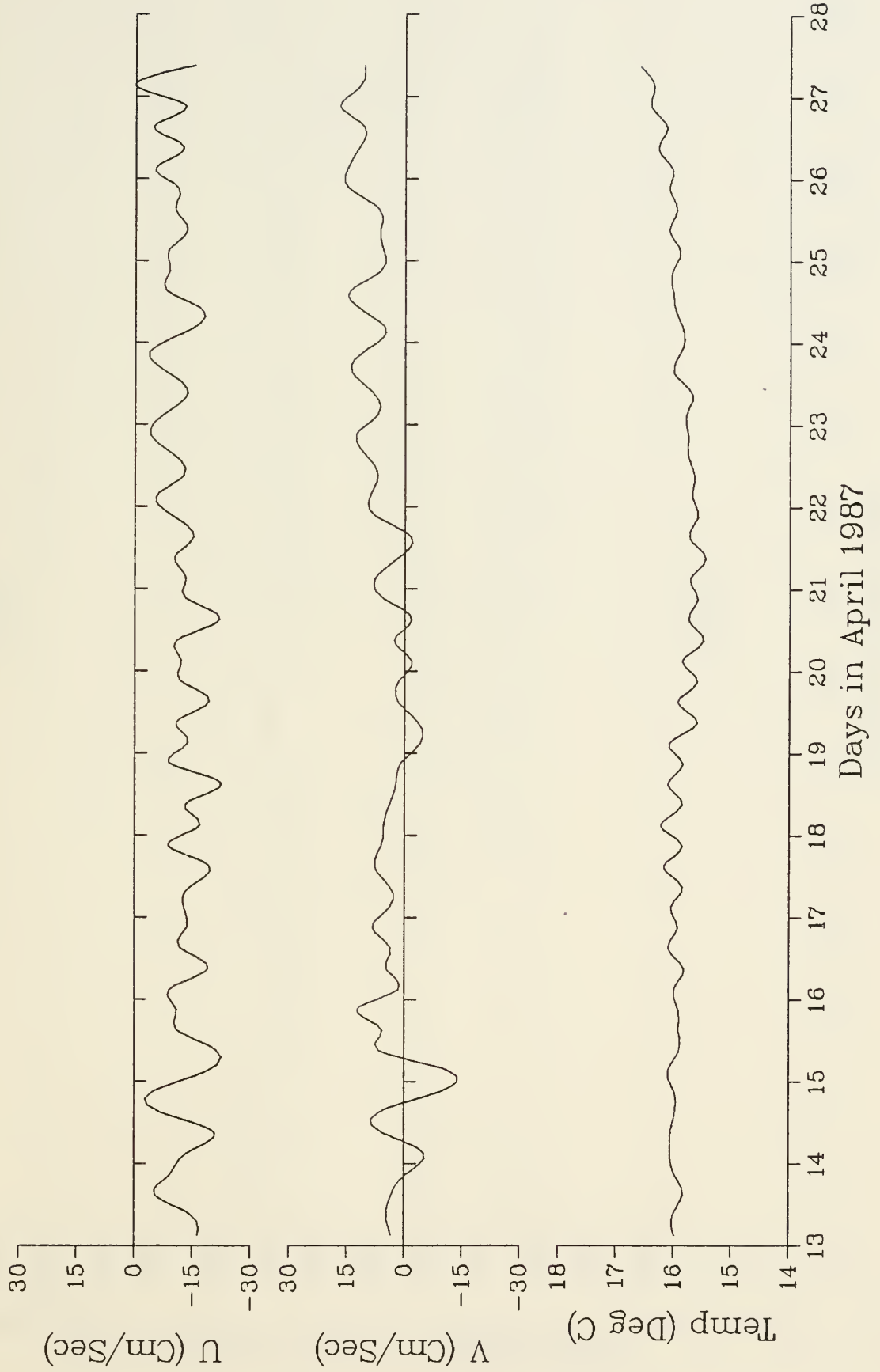


FIGURE 5.3

V13

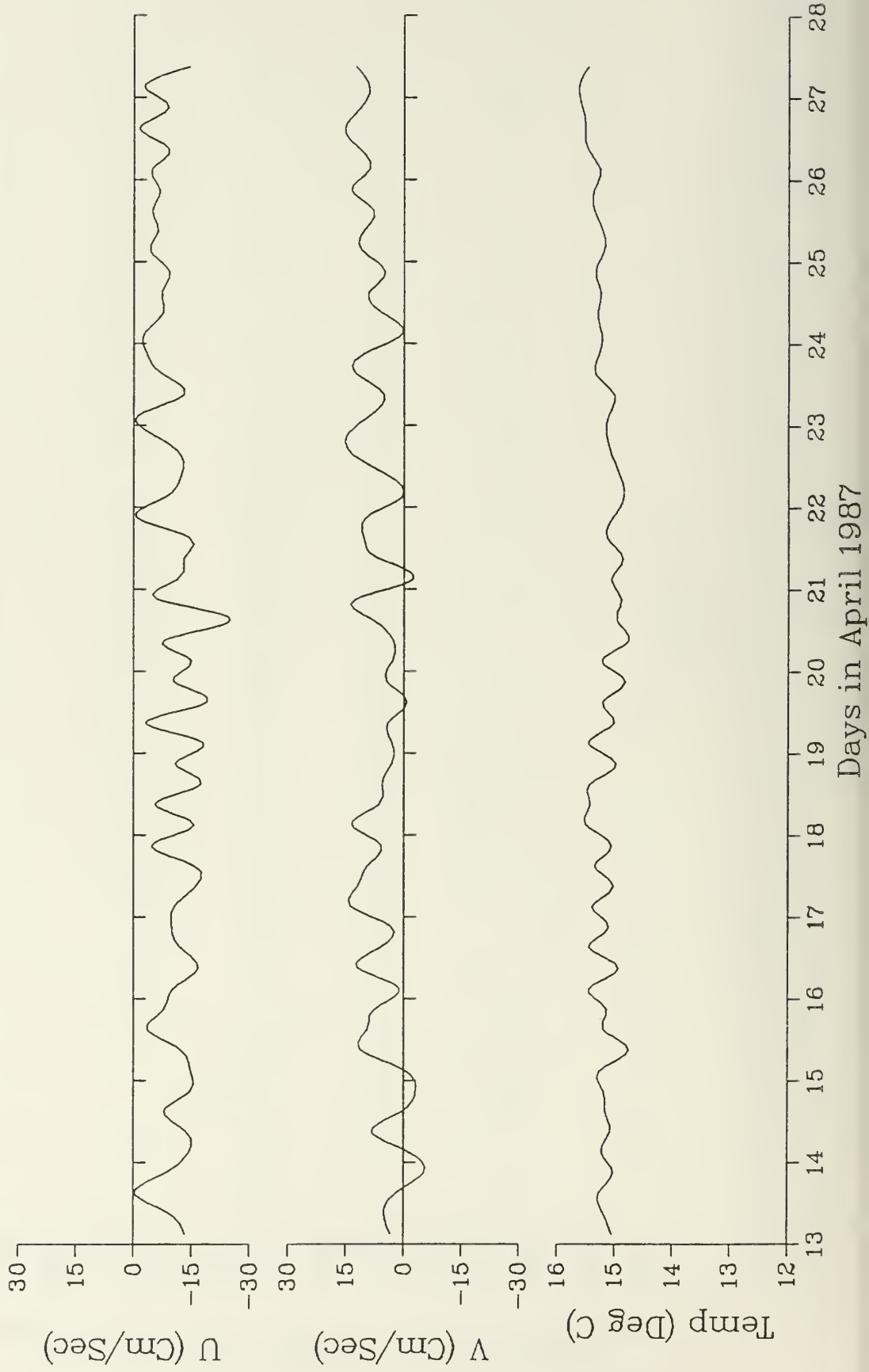


FIGURE 5.4

V14

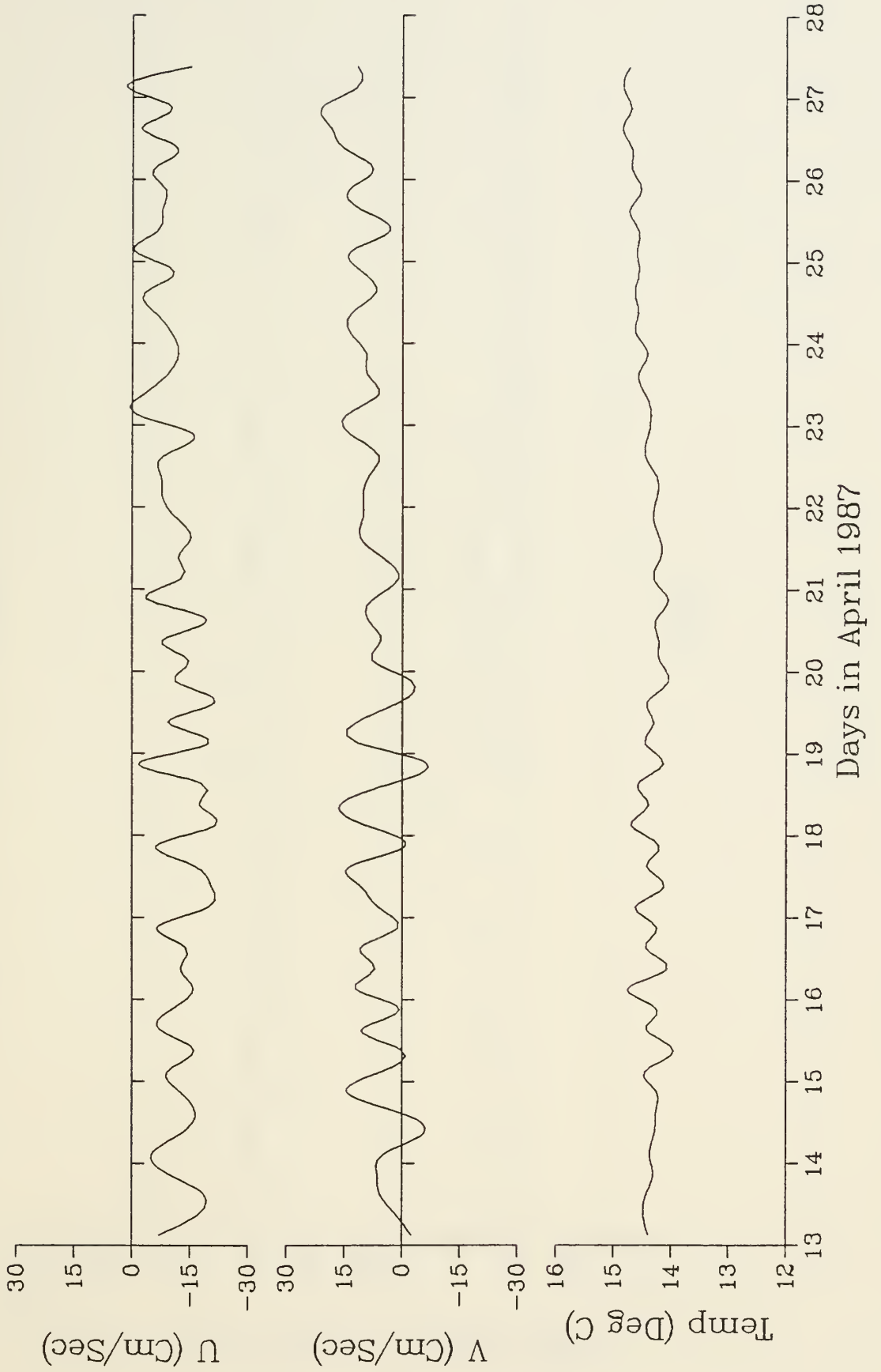


FIGURE 5.5

V15

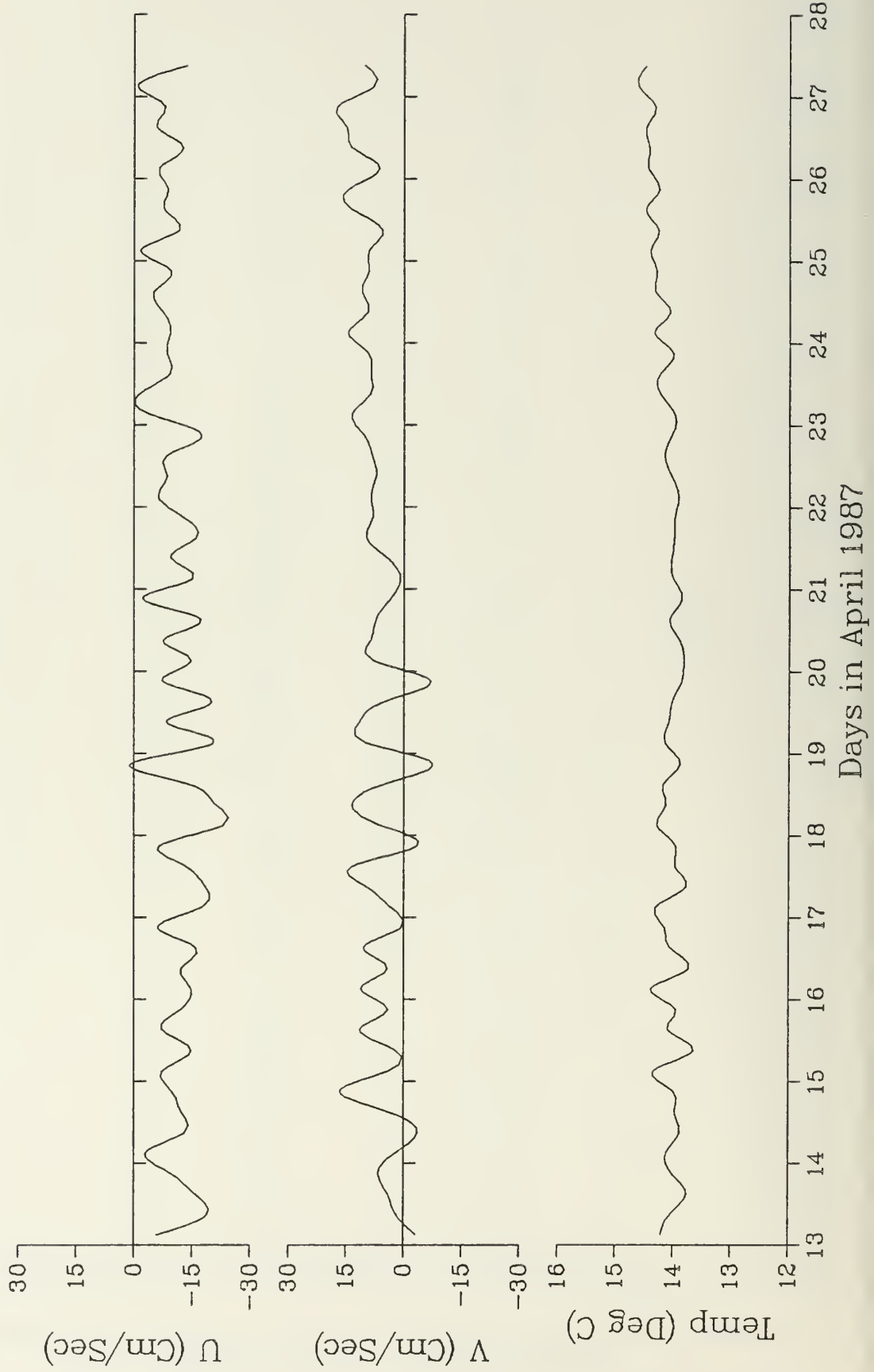


FIGURE 5.6

V23

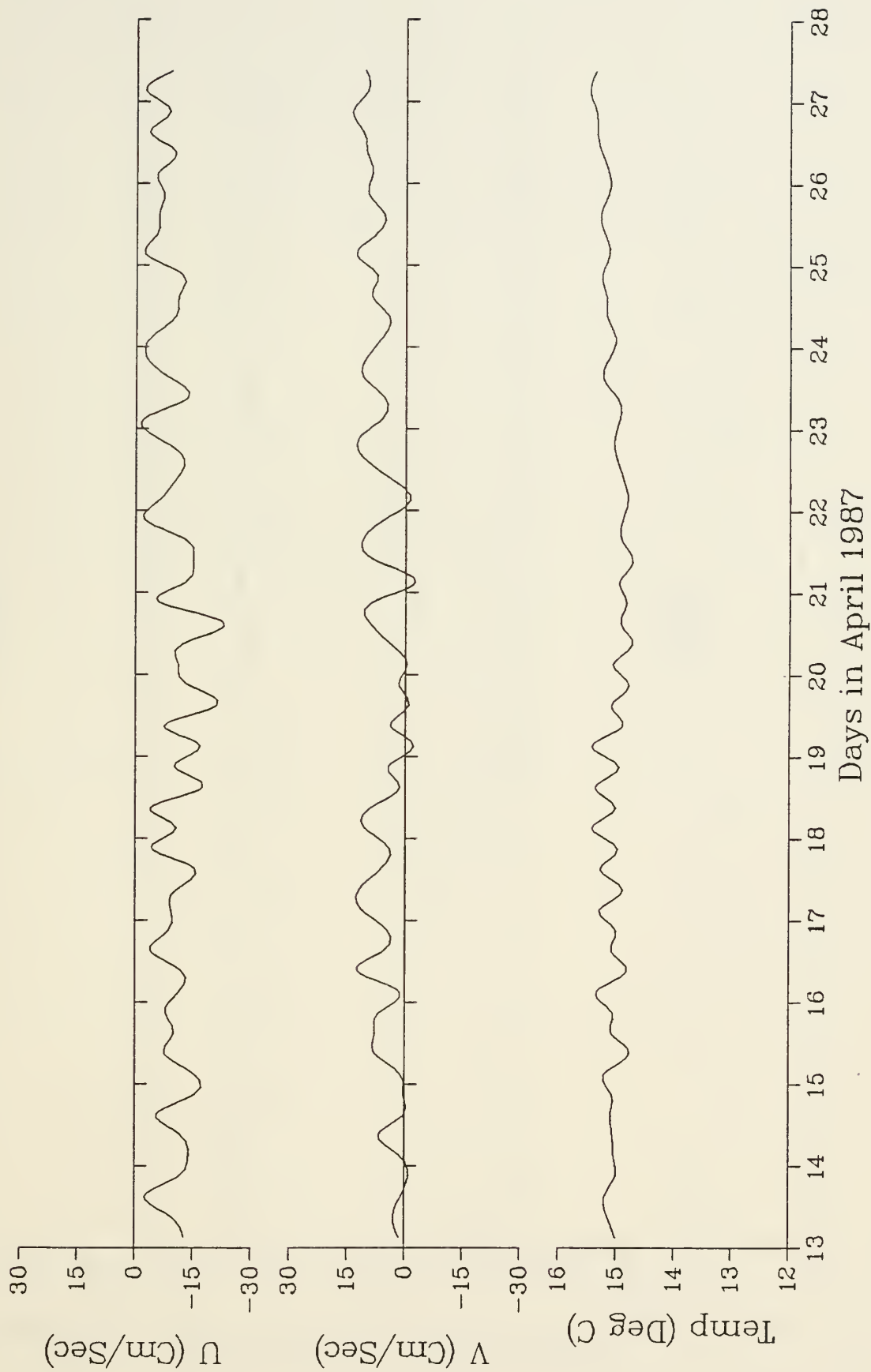


FIGURE 5.7

V25

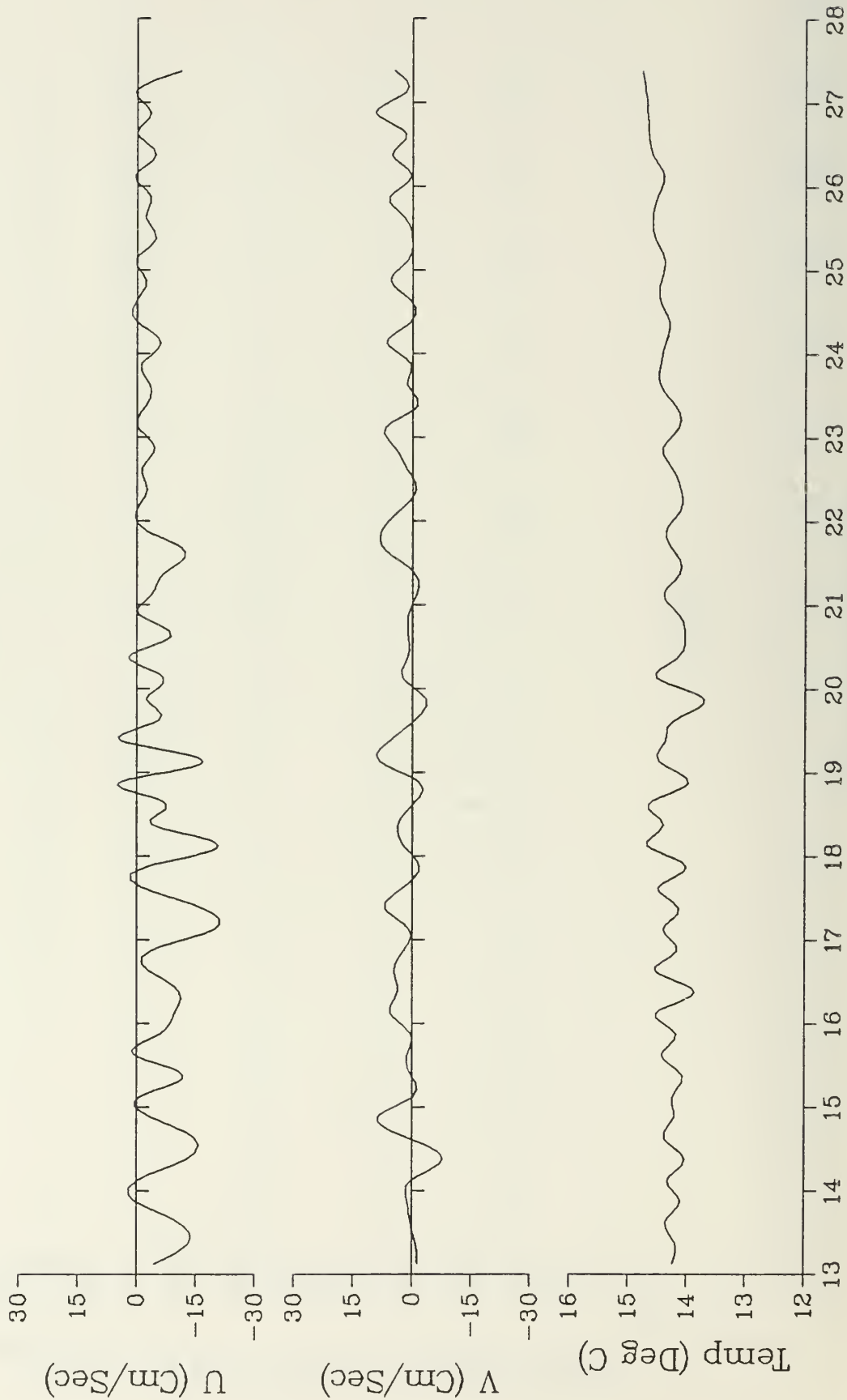
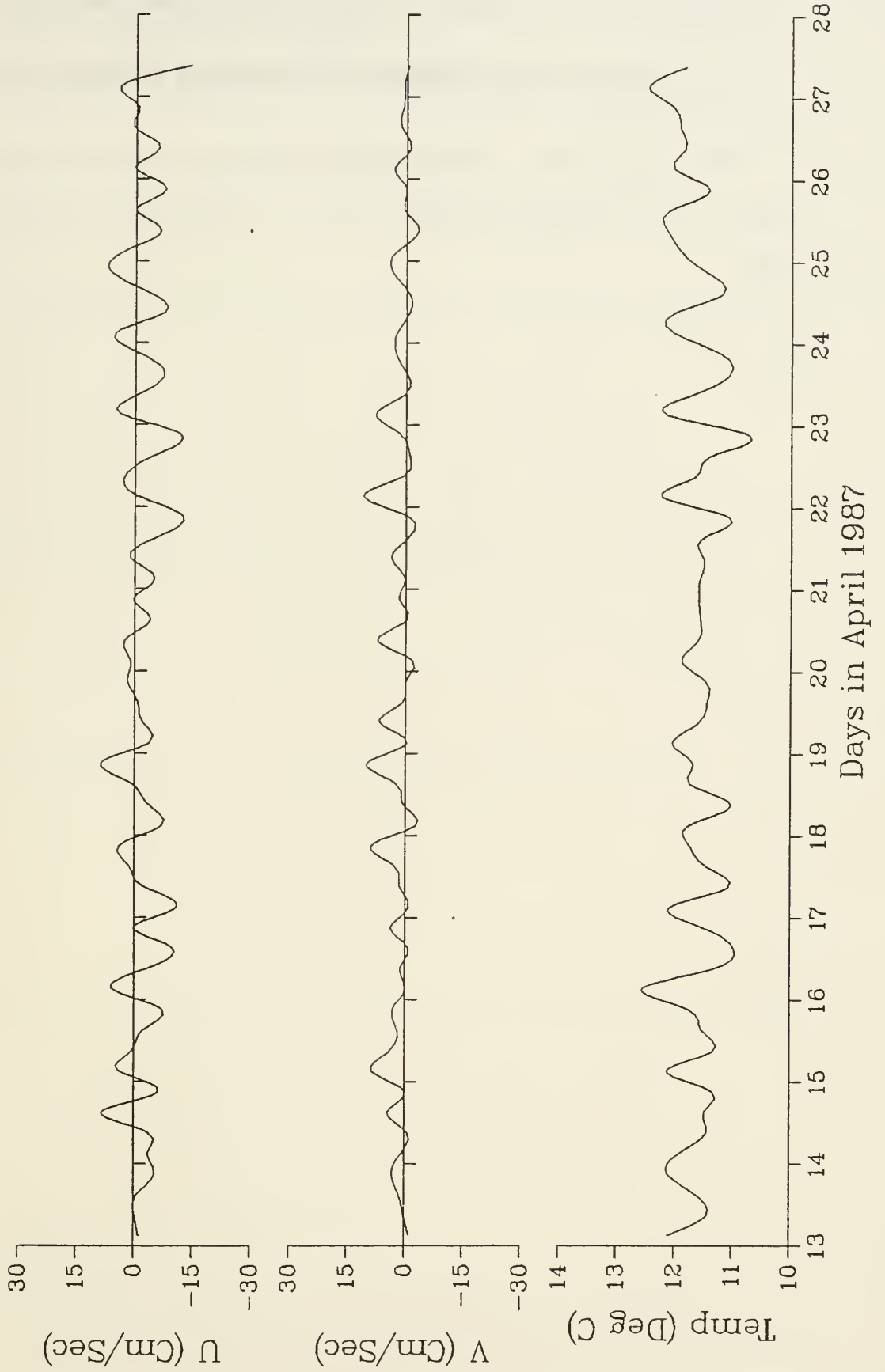


FIGURE 5.8

V26



6. Low Pass Filtered Mooring Composites

The low pass filtered velocity component and temperature time series presented in section 5 are composited separately in Figure 6 on page 63 for moorings 87V1 and 87V2.

Figure 6. Figures 6.1 - 6.3: Low pass filtered velocity components and temperature time series composited for mooring 87V1. Figures 6.4 - 6.6: Same time series composited for mooring 87V2.

FIGURE 6.1

87V1 COMPOSITE

U (Cm/Sec)

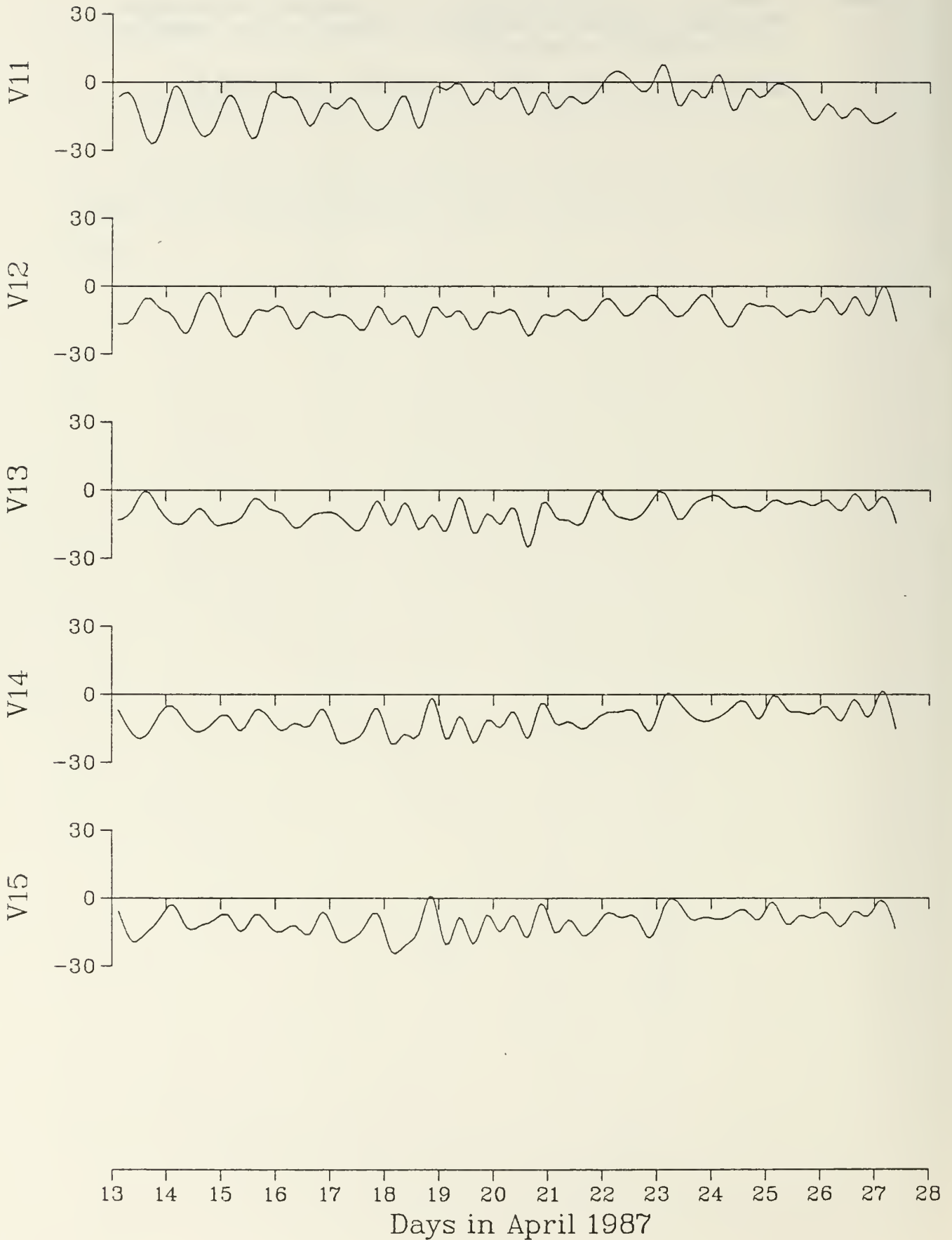
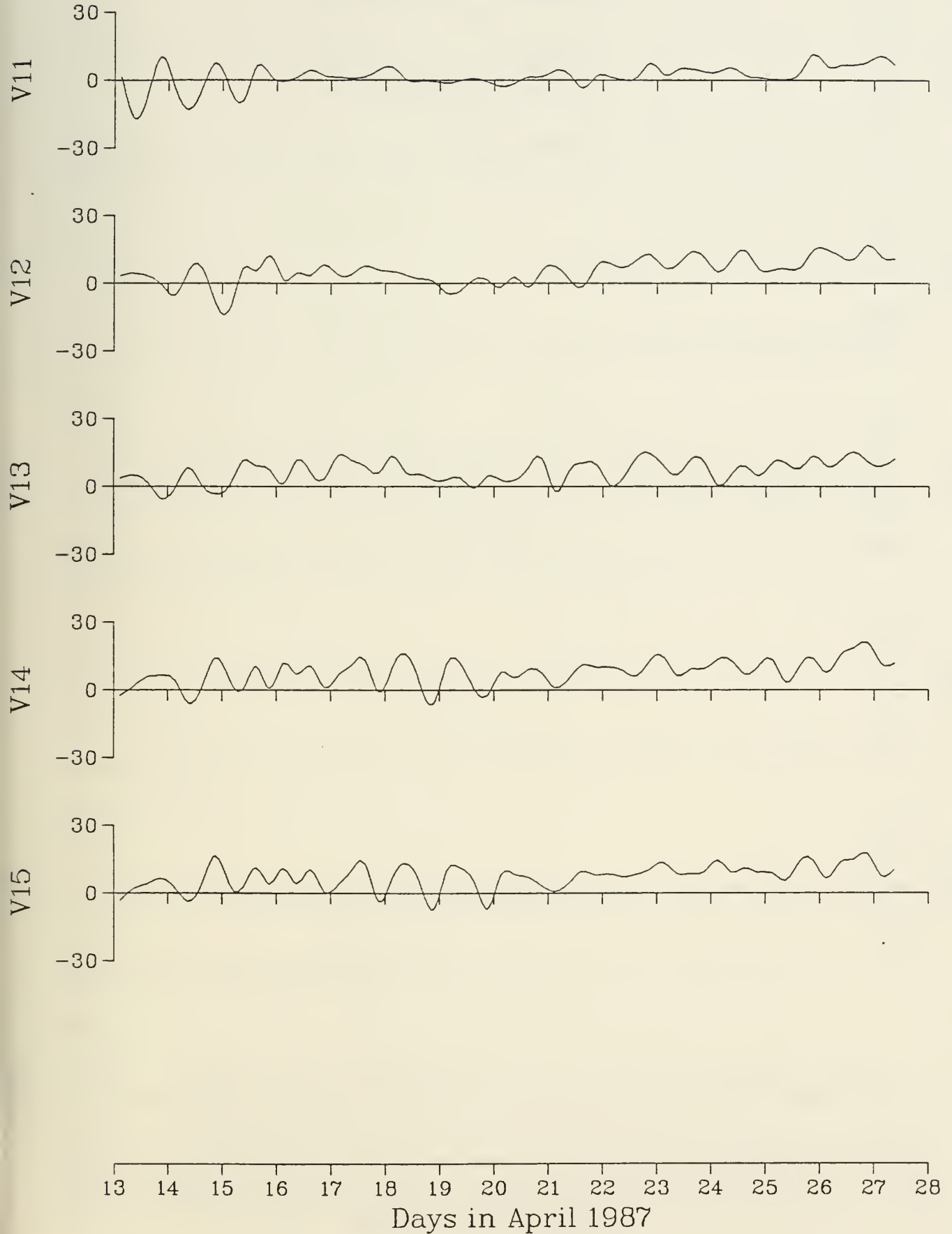


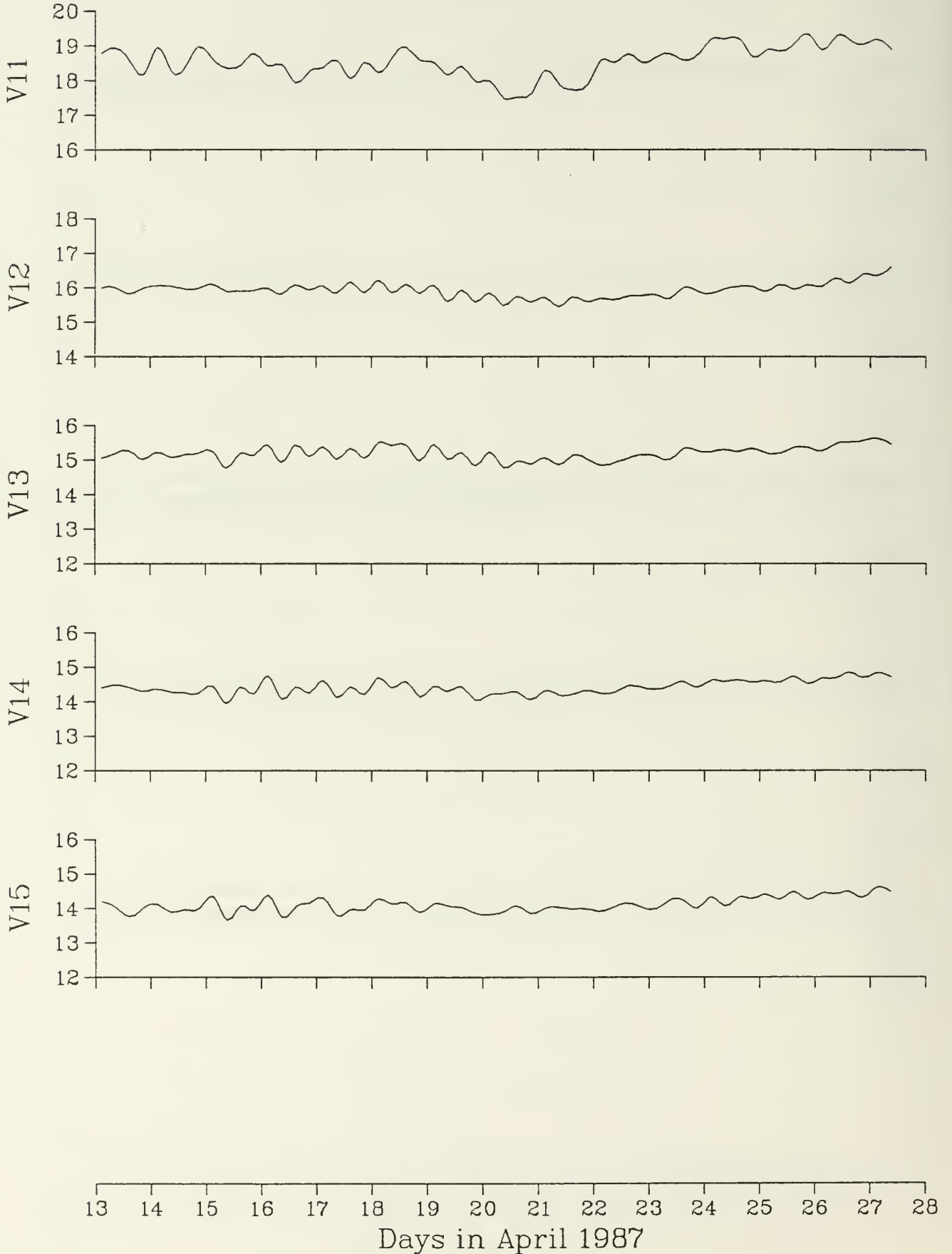
FIGURE 6.2

87V1 COMPOSITE

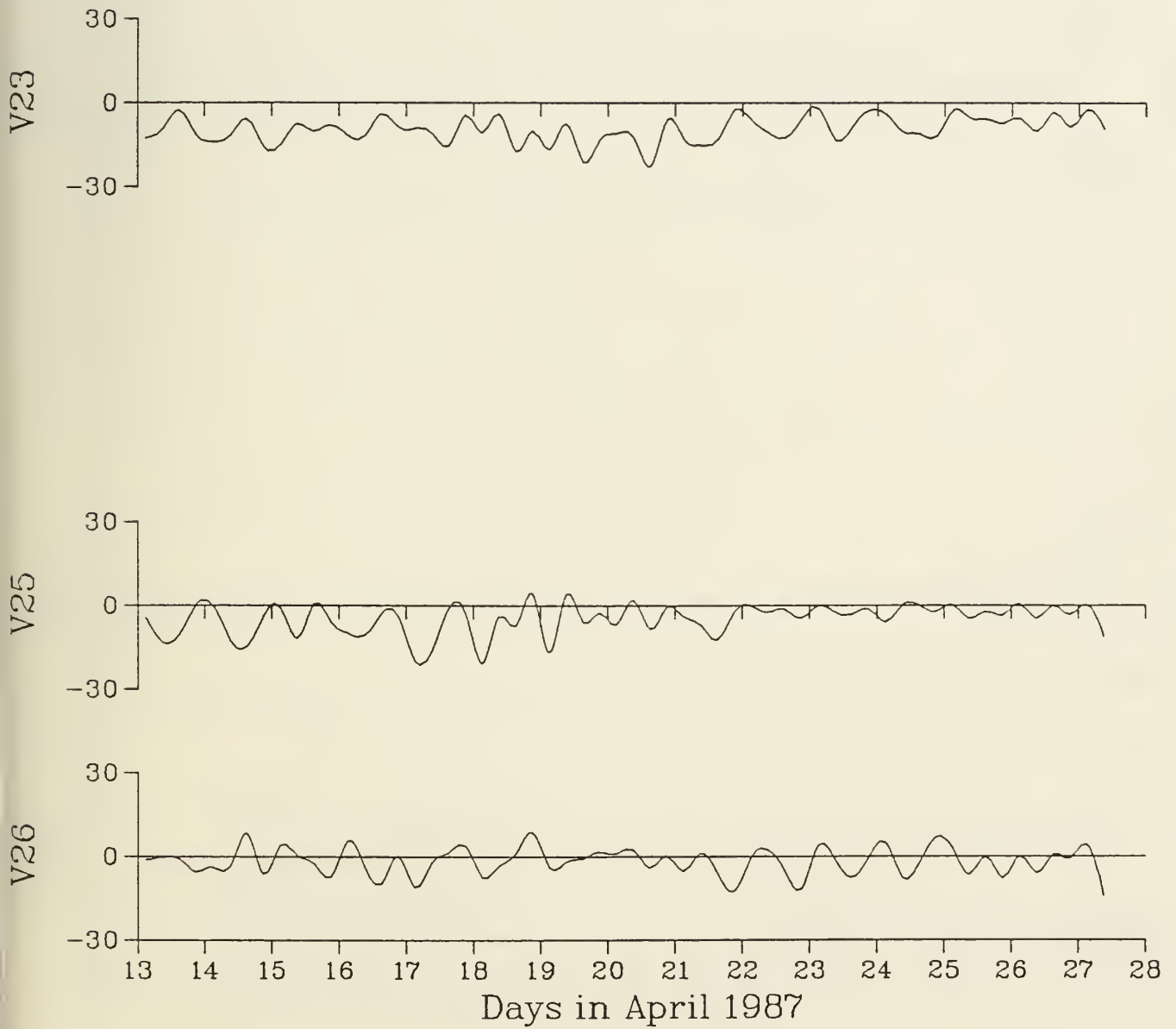
V (Cm/Sec)



87V1 COMPOSITE Temperature (Deg C)

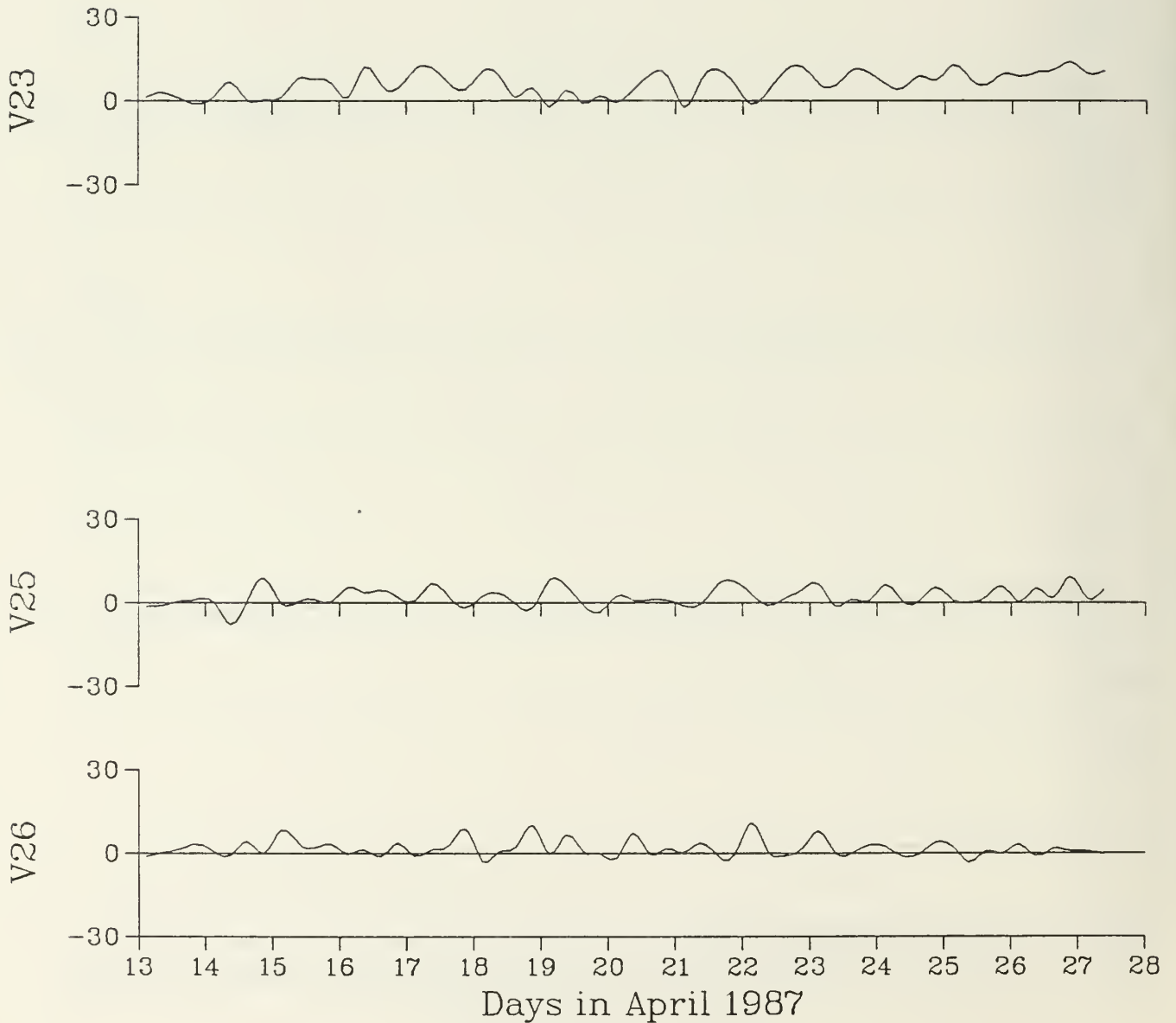


87V2 COMPOSITE
U (Cm/Sec)

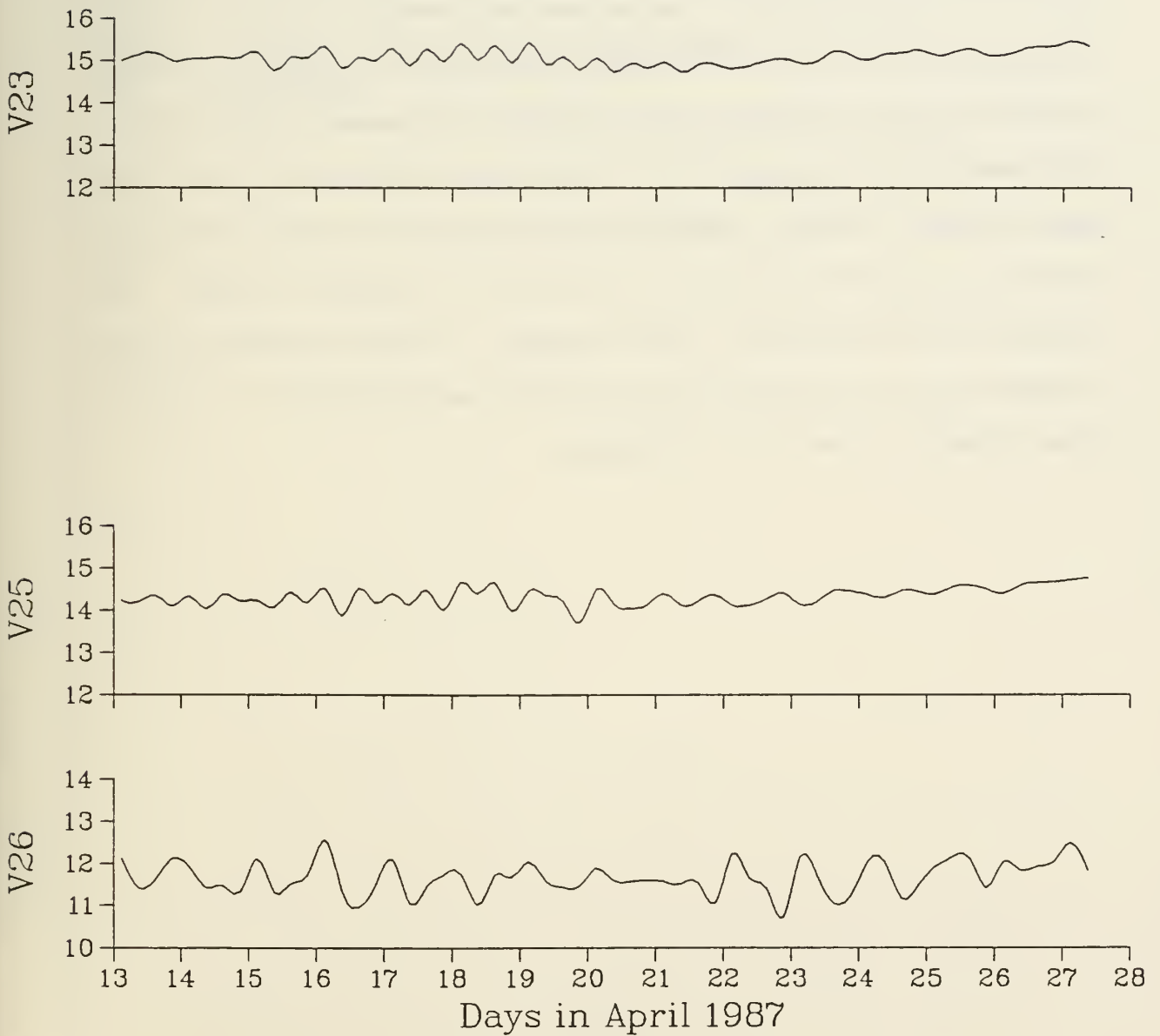


87V2 COMPOSITE

V (Cm/Sec)



87V2 COMPOSITE Temperature (Deg C)



7. Variance Density Spectra

The velocity and temperature variance spectra for the time series presented in section 3 are given in Figure 7 on page 72. The data were first truncated to the time window of 2330 12 April 1987 to 1330 27 April 1987 and were then broken up into seven 50-hour windows. The time series for each 50-hour window was demeaned and multiplied by a ten percent cosine taper function. The cosine tapered windows were then transformed using the FFTRC International Statistics and Mathematics Library (IMSL) routine. The variances from the 7 windows were then summed to increase the degrees of freedom to 14, and the sums were divided by 0.86 to correct for tapering. To decrease the noise in the higher frequency ranges, independent block averages of three band intervals were applied in the range from 0.5 C.P.H. (cycles per hour) to 2.0 C.P.H. for 42 degrees of freedom. Similarly, independent block averages of five band intervals were applied in the range from 2.02 C.P.H. to 6.0 C.P.H. for 70 degrees of freedom. The variances for the data are shown in Table 4 on page 71. The 90% confidence intervals for random errors were calculated based upon the chi-squared distribution with the given degrees of freedom and are shown in the figures.

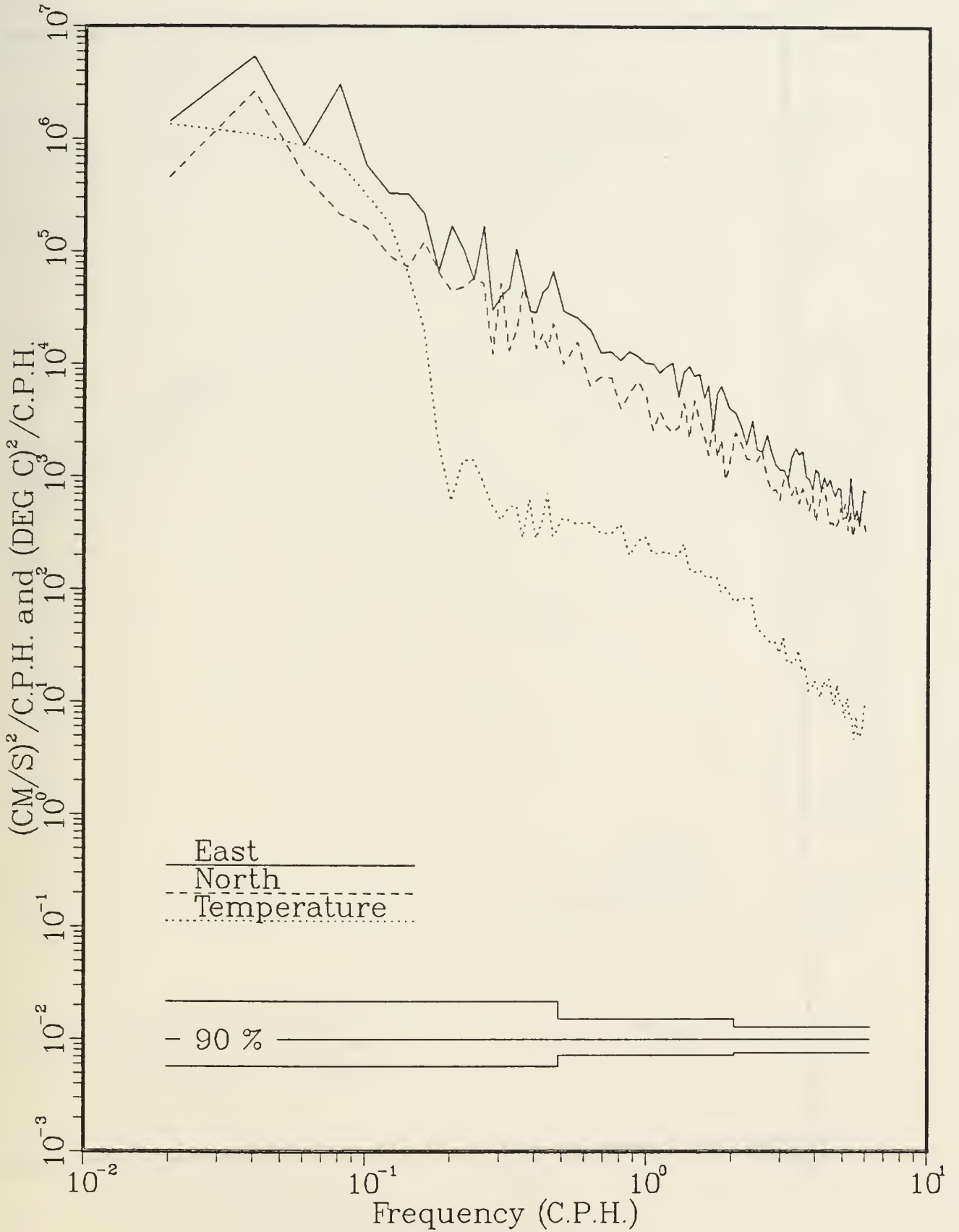
Current Meter	East (Cm/Sec) ²	North (Cm/Sec) ²	Temperature (Deg C) ²
V11	79.14	29.05	25.19
V12	47.51	31.06	18.44
V13	48.18	35.56	16.77
v14	67.47	43.61	15.05
v15	70.24	45.17	14.36
v23	37.97	24.18	16.50
v25	50.81	21.91	14.91
v26	69.83	32.65	9.98

Table 4. Variances of the velocity components and temperature

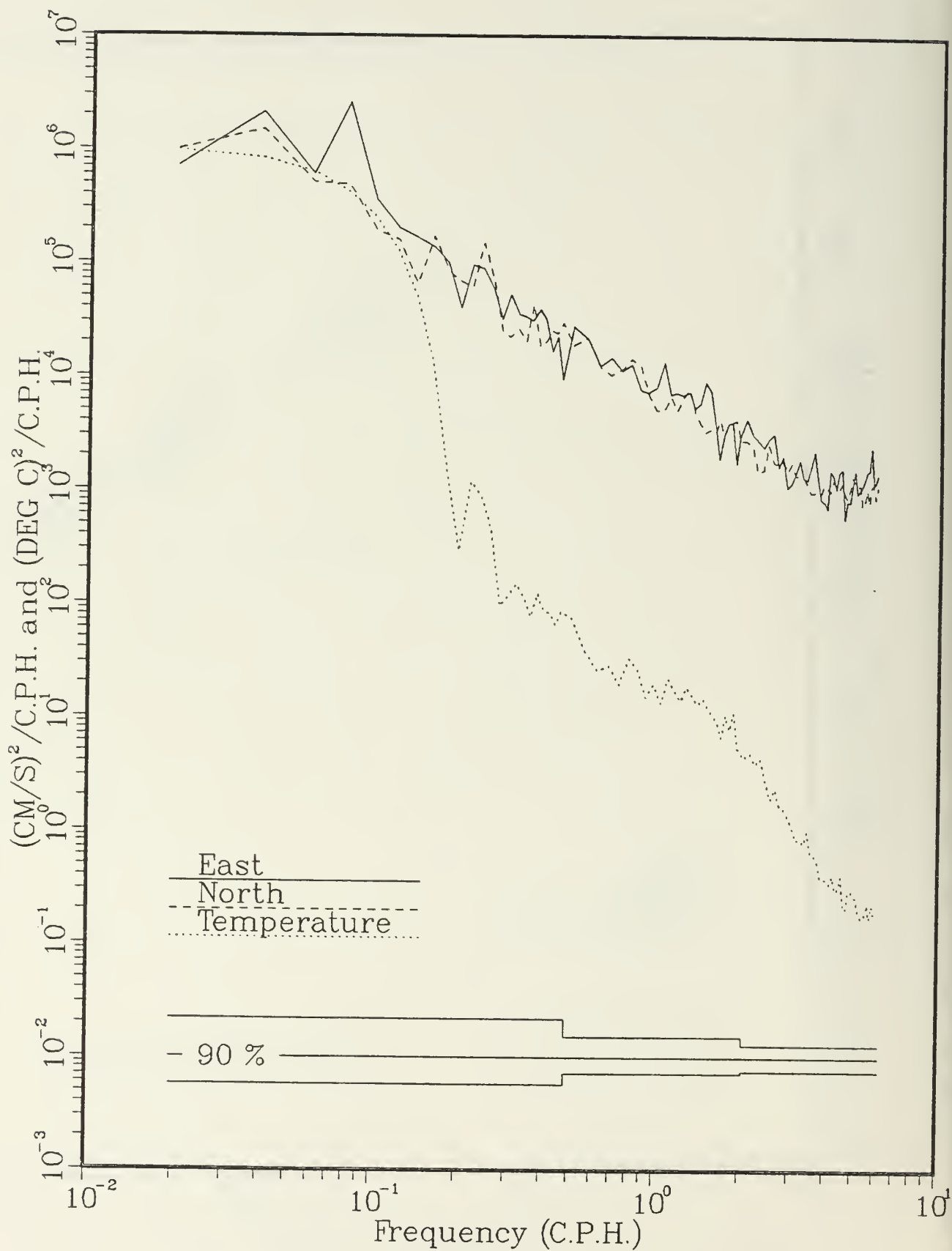
Figure 7. Figures 7.1 - 7.8: Velocity component and temperature variance density spectra.



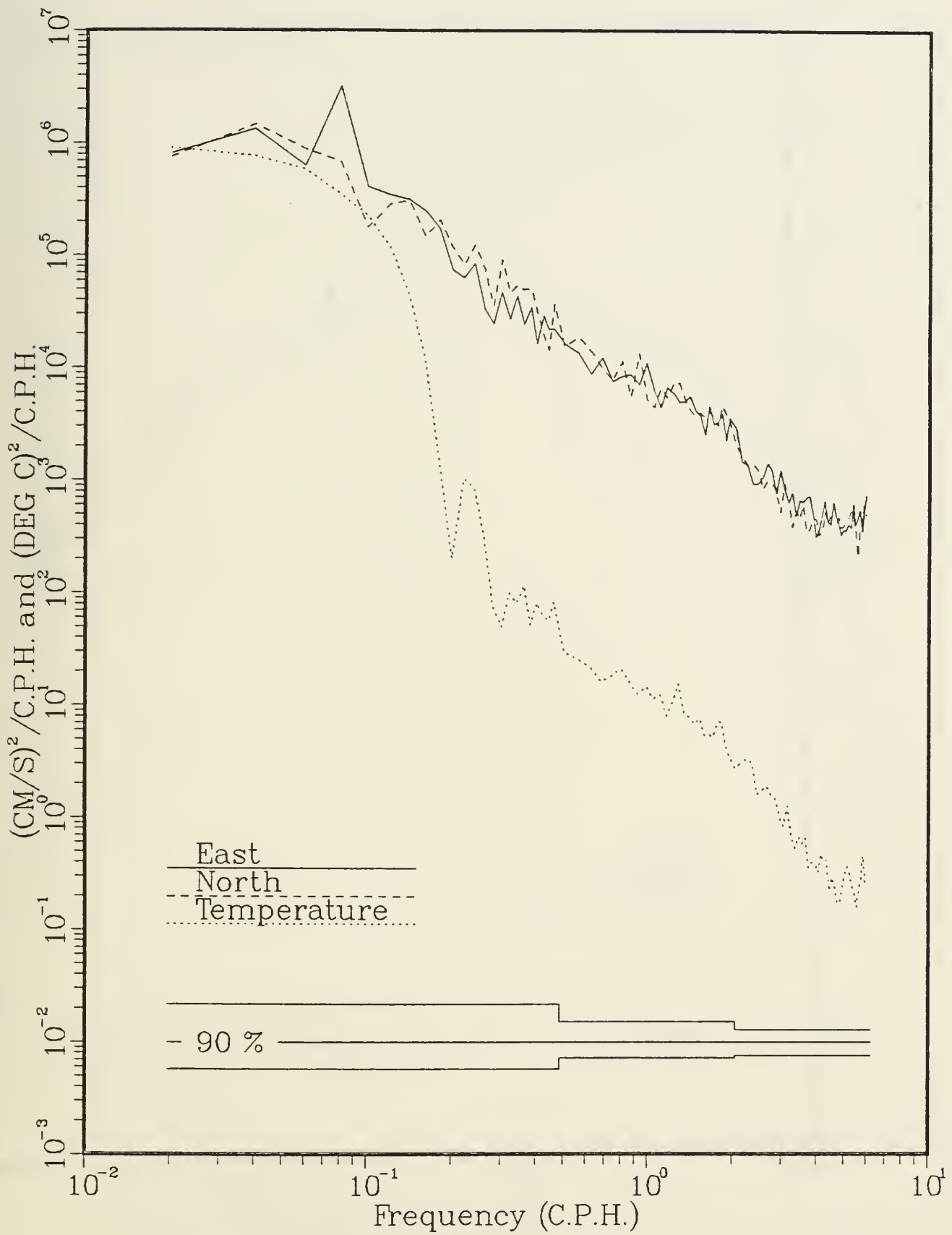
V11



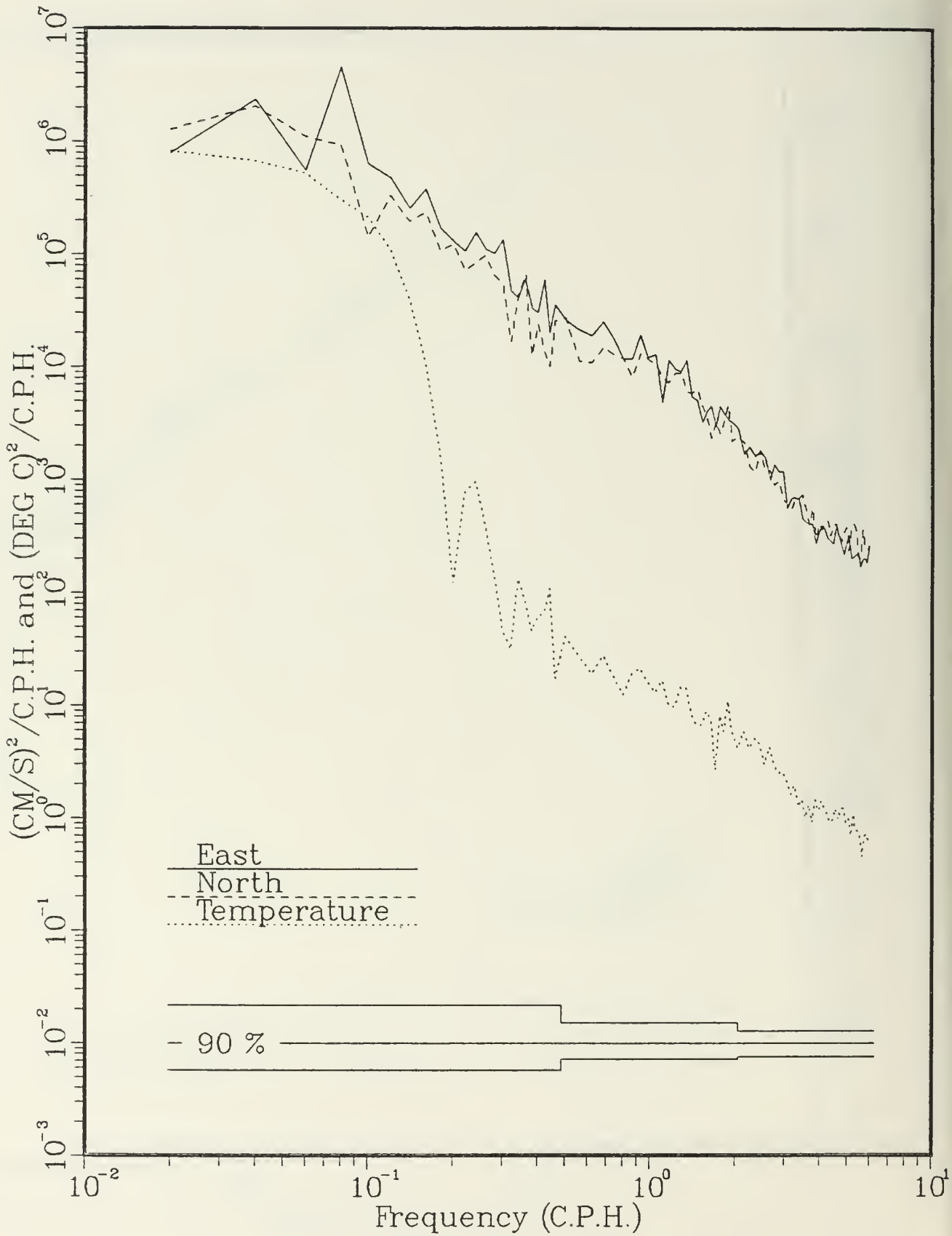
V12



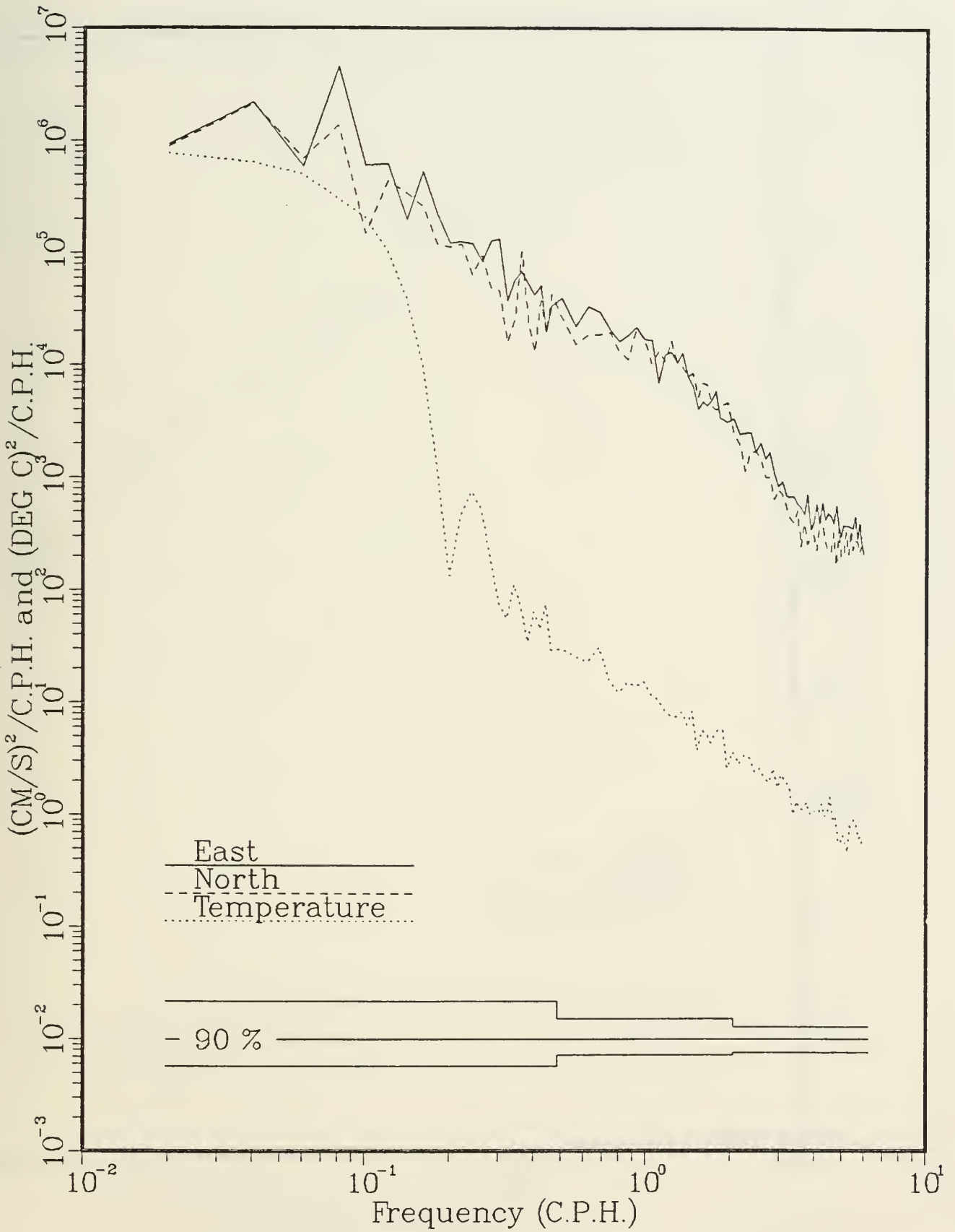
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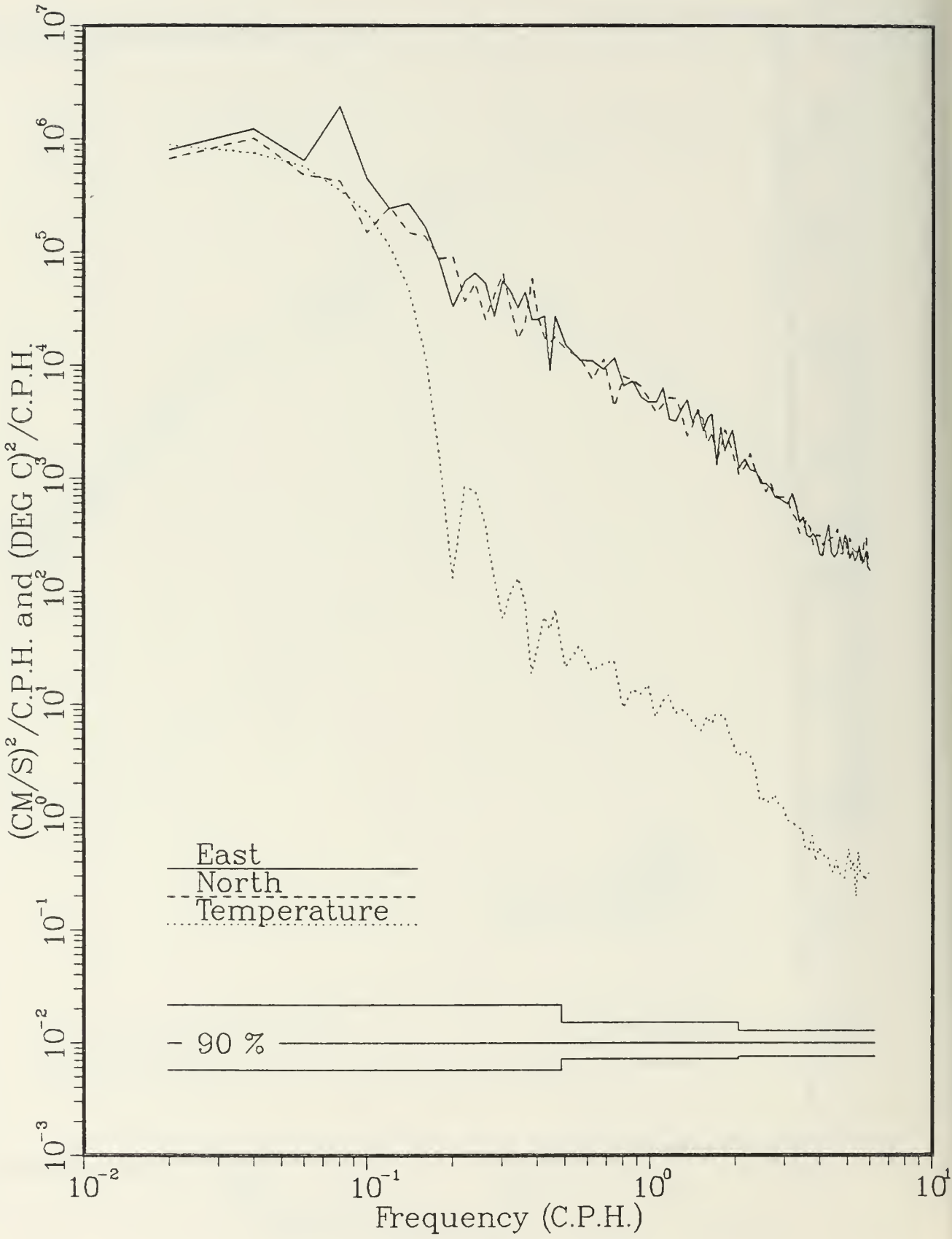
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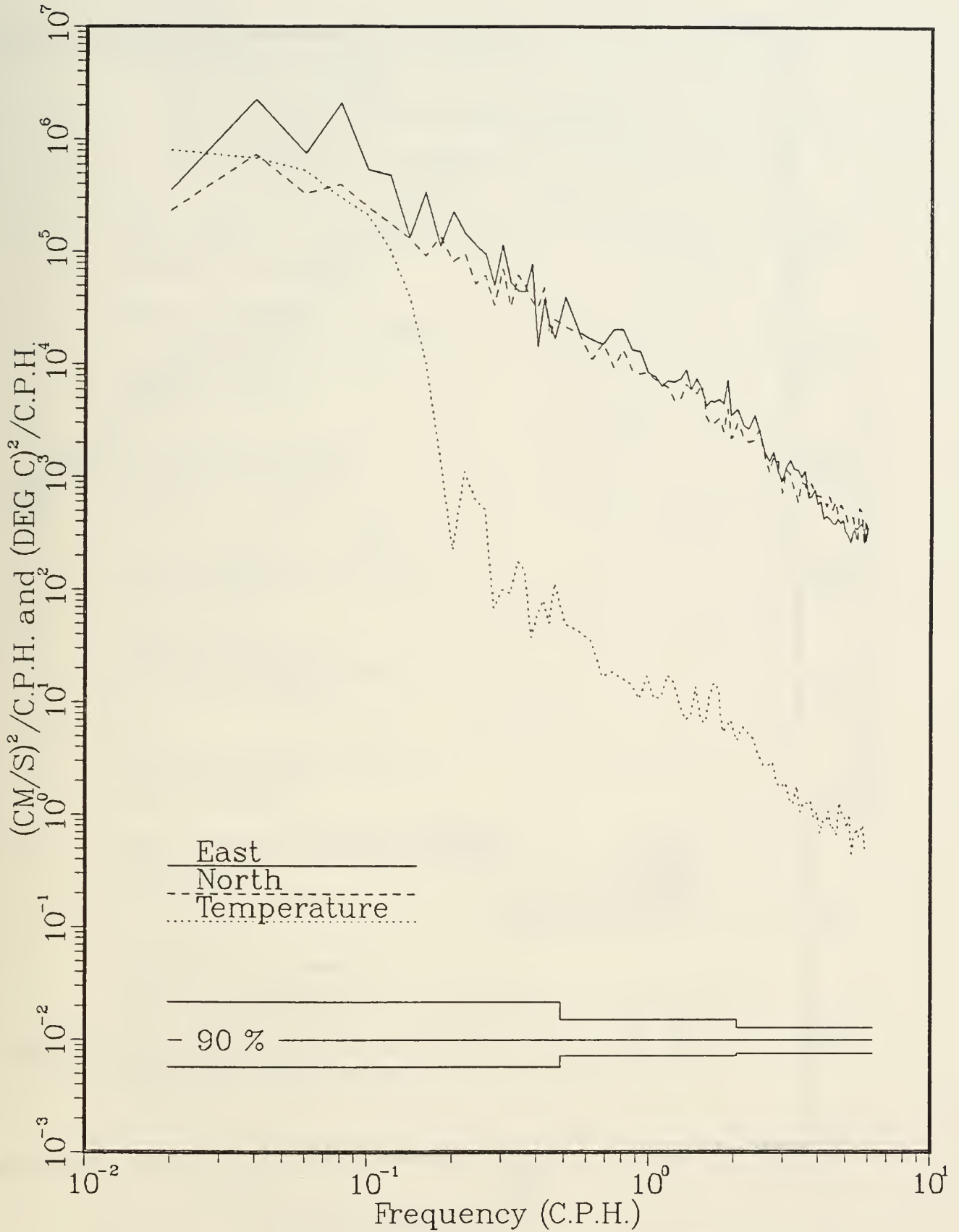
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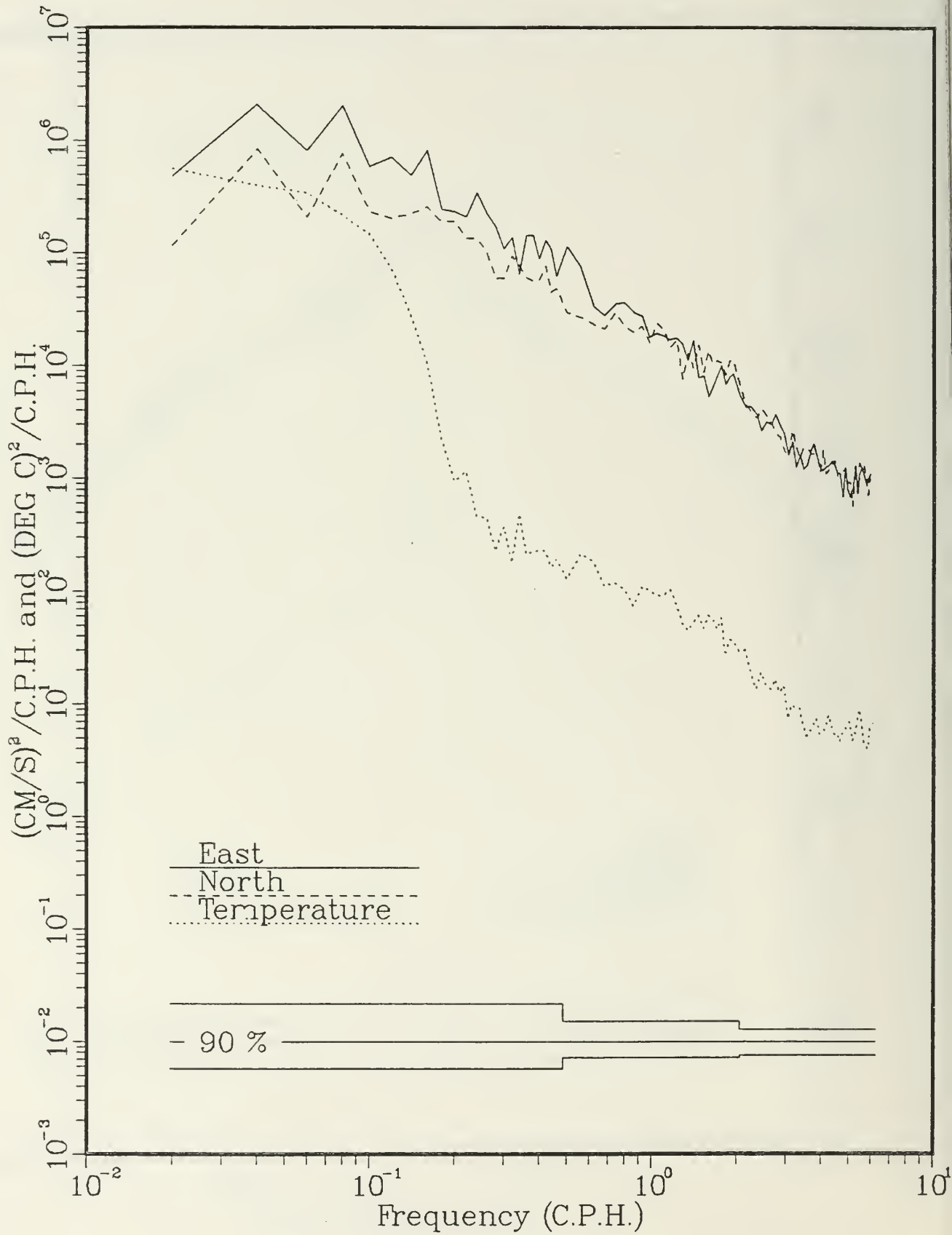
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